



EBERLINE SERVICES

EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD
OAK RIDGE, TENNESSEE 37830
PHONE (865) 481-0683
FAX (865) 483-4621

EBS-OR-35717

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June 20, 2013

Ed Galbraith
Barr Engineering
1001 Diamond Ridge, Suite 1100
Jefferson City, MO 65109

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CASE NARRATIVE Work Order # 13-06015-OR

SAMPLE RECEIPT

This work order contains one water sample received 06/04/2013. This sample was analyzed for Radium-228, Gross Alpha/Beta, Total Activity and by Gamma Spectroscopy. This sample was also analyzed as dissolved and suspended for Gross Alpha/Beta.

CLIENT ID

LAB ID

Treated Commingled MSD	13-06015-04
Treated Commingled MSD-DISS	13-06015-05
Treated Commingled MSD-SUS	13-06015-06

ANALYTICAL METHODS

Radium-228 was analyzed using EPA Method 904.0 Modified. Gross Alpha/Beta was performed using EPA Method 900.0 Modified. Total Activity was performed using Method WSRC-RP-89-387 Modified. Gamma Spectroscopy was performed using EPA Method 901.1 Modified.

ANALYTICAL CIRCUMSTANCES

Sample identification Treated Commingled MSD was received for determination of an unknown Beta emitting radionuclide(s) present in the sample. Initially we only received approximately 50 milliliters of total volume. However, an additional 700 milliliters of volume was also received. This sample had a very high total dissolved solids (TDS) content and total suspended solids (TSS) content. In the case of our initial investigations, we initially analyzed the higher volume sample, with the TSS content at the bottom of the sample, by gamma spectroscopy. Analysis of the sample only demonstrated the presence of Potassium-40 activity.

We then placed 5 milliliters of the sample into scintillation cocktail and counted for Total Activity. Results were problematic by this method due to significant quenching. However, we estimated efficiency and determined a result. Liquid scintillation counting (LSC) spectral evaluations were inconclusive other than demonstrating the presence of a Beta emitting radionuclide. Evaluation of LSC spectra did not demonstrate the presence of any Alpha emitting radionuclides.

At this point a Gross Alpha and Beta determination was conducted to check previous Gross Alpha and Beta results. Sample demonstrated no positive Gross Alpha activity.

ANALYTICAL CIRCUMSTANCES CONTINUED

We also analyzed for Radium-228 to determine if Radium-228 or Actinium-228 were present. This analysis would also provide a positive result if Strontium-Yttrium-90 were present. Yttrium-90 is an interference in the analysis of Radium-228 by Actinium-228. Sample demonstrated non-detect results for Radium-228 or Yttrium-90.

At this point we analyzed sample in the dissolved and suspended fractions for Gross Alpha and Beta again. Sample demonstrated positive Gross Beta activity in the dissolved fraction. Activity actually correlates fairly well with Potassium-40 by gamma spectroscopy. Due to this condition and the high uncertainties associated with these results, we had the sample analyzed for elemental Potassium. The radioactive Potassium contributions were then calculated and determined to be consistent with results from gamma spectroscopy and dissolved Gross Beta analyses.

In conclusion, the sample appears to contain Beta activity from only Potassium-40 within the sample. Higher activity results are most likely artifacts from analyzing the sample as Total (TSS & TDS combined) causing significant corrections for self-absorption. This sample may be somewhat heterogeneous with respect to Potassium-40 activity in the suspended fraction, which may have caused some variability. This sample is definitely problematic to analyze as a result of the TDS and TSS content.

ANALYTE SPECIFIC QC SUMMARIES

RADIUM-228

Sample aliquots were evaporated and digested to dissolve the TSS fraction. Sample was then diluted and Radium was precipitated as Radium/Barium Sulfate. Radium/Barium Sulfates were then dissolved in alkaline EDTA. Radium was selectively precipitated and Radium Sulfate from the EDTA by pH reduction. Actinium-228 ingrowth was started at this time. Actinium-228 was allowed sufficient ingrowth time and was then selectively extracted, mounted on planchets and counted by GPC. An elemental Yttrium carrier was used for determination of chemical yield.

Sample demonstrated acceptable results for all Radium-228 determinations. The Radium-228 method blank demonstrated an acceptable result. Results for the Radium-228 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Radium-228 laboratory control sample demonstrated an acceptable percent recovery.

GROSS ALPHA & BETA (TOTAL)

Sample was vigorously shaken to re-suspend the TSS fraction. Sample aliquots were taken and placed onto planchets. Sample was then flamed and sent to the count room for gas proportional counting (GPC) of Gross Alpha & Beta activity present. Sample results were corrected for inherent self-absorption by determinations of mass present on counting planchets. Due to the high TSS and TDS content, small aliquots and significant corrections were required.

Sample demonstrated problematic results for Gross Alpha and Beta determinations. Due to the high TDS and TSS content, sample demonstrated a high relative percent difference (Gross Alpha and Beta) and normalized difference (Gross Beta only). The Gross Alpha and Beta method blank demonstrated acceptable results. Results for the Gross Alpha and Beta laboratory control sample demonstrated an acceptable percent recovery.

ANALYTE SPECIFIC QC SUMMARIES

GROSS ALPHA & BETA (DISSOLVED & SUSPENDED)

Aliquots of the sample were filtered through 0.45 um filter media with +0.45um being the suspended fraction and -0.45um being the dissolved fraction. Samples were then flamed and sent to the count room for gas proportional counting (GPC) of Gross Alpha & Beta activity present. Sample results were corrected for inherent self-absorption by determinations of mass present on counting planchets. Due to the high TSS and TDS content, small aliquots and significant corrections were required.

Samples demonstrated somewhat acceptable results for all Gross Alpha and Beta determinations. The Gross Alpha and Beta method blank demonstrated acceptable results. Due to the high TDS content, results for the Gross Alpha and Beta duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Gross Alpha and Beta laboratory control sample demonstrated an acceptable percent recovery.

TOTAL ACTIVITY

A direct aliquot of sample was placed into a scintillation vial, scintillation cocktail was added and sample was counted on a liquid scintillation counter. This was done not so much for actual quantification; however, qualification of the potential energy of the Beta emitting radionuclide present.

Results for the sample are problematic. Due to the high TDS and TSS content, sample demonstrated significant quenching. This made it virtually impossible to identify energy of the Beta emitting radionuclide. The Total Activity method blank demonstrated an acceptable result. Results for the Total Activity laboratory control sample demonstrated an acceptable percent recovery.

GAMMA SPECTROSCOPY

Sample was analyzed using client provided sample volume in the container as received from the client. This was done to assure that the TSS fraction from the sample was in close proximity to the detector. Sample was then counted using an N-Type HPGe detector.

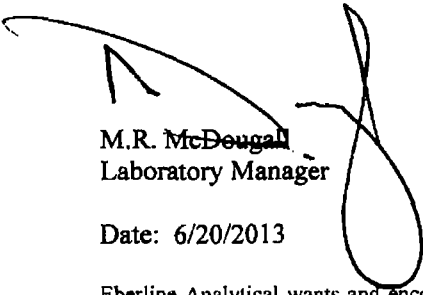
Sample demonstrated acceptable results for all gamma emitting radionuclides as reported. The method blank demonstrated acceptable results for all gamma emitting radionuclides as reported. Results for the Actinium-228 and Bismuth-214 replicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Cobalt-60 replicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Cobalt-60 and Cesium-137 laboratory control sample demonstrated an acceptable percent recovery.

ELEMENTAL POTASSIUM – K-40 DETERMINATION

An aliquot of the sample was sent to Galbraith Laboratories for determination of elemental Potassium. From this result radioactive K-40 was calculated. Results for Elemental converted Potassium to radioactive K-40 demonstrated good correlations with K-40 results as derived by gamma spectroscopy and Gross Beta determinations from the dissolved fraction.

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.



M.R. McDougall
Laboratory Manager

Date: 6/20/2013

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SECTION IV
ANALYTICAL RESULTS SUMMARY

Eberline Analytical Final Report of Analysis			Report To:					Work Order Details:					
			Ed Galbraith					SDG:	13-06015				
			Barr Engineering					Project:	Bridgeton Landfill				
			1001 Diamond Ridge, Suite 1100					Analysis Category:	ENVIRONMENTAL				
			Jefferson City, MO 65109					Sample Matrix:	WA				
Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
13-06015-01	LCS	KNOWN	06/05/13 00:00	6/5/2013	6/6/2013	13-06015	Cobalt-60	EPA 901.1 Modified	1.94E+05	7.76E+03			pCi/l
13-06015-01	LCS	KNOWN	06/05/13 00:00	6/5/2013	6/6/2013	13-06015	Cesium-137	EPA 901.1 Modified	1.18E+05	4.72E+03			pCi/l
13-06015-01	LCS	SPIKE	06/05/13 00:00	6/5/2013	6/6/2013	13-06015	Cobalt-60	EPA 901.1 Modified	1.97E+05	1.44E+04	1.76E+04	9.09E+02	pCi/l
13-06015-01	LCS	SPIKE	06/05/13 00:00	6/5/2013	6/6/2013	13-06015	Cesium-137	EPA 901.1 Modified	1.21E+05	1.21E+04	1.36E+04	6.15E+02	pCi/l
13-06015-02	MBL	BLANK	06/05/13 00:00	6/5/2013	6/6/2013	13-06015	Actinium-228	EPA 901.1 Modified	4.60E+01	3.03E+01	3.04E+01	7.00E+01	pCi/l
13-06015-02	MBL	BLANK	06/05/13 00:00	6/5/2013	6/6/2013	13-06015	Bismuth-214	EPA 901.1 Modified	-7.76E+00	1.72E+01	1.72E+01	3.23E+01	pCi/l
13-06015-02	MBL	BLANK	06/05/13 00:00	6/5/2013	6/6/2013	13-06015	Cobalt-60	EPA 901.1 Modified	3.12E+00	9.51E+00	9.51E+00	2.04E+01	pCi/l
13-06015-02	MBL	BLANK	06/05/13 00:00	6/5/2013	6/6/2013	13-06015	Cesium-137	EPA 901.1 Modified	3.94E+00	7.81E+00	7.81E+00	1.57E+01	pCi/l
13-06015-02	MBL	BLANK	06/05/13 00:00	6/5/2013	6/6/2013	13-06015	Lead-210	EPA 901.1 Modified	-2.90E+01	1.95E+02	1.95E+02	3.45E+02	pCi/l
13-06015-02	MBL	BLANK	06/05/13 00:00	6/5/2013	6/6/2013	13-06015	Lead-214	EPA 901.1 Modified	-7.01E+00	1.68E+01	1.68E+01	3.05E+01	pCi/l
13-06015-02	MBL	BLANK	06/05/13 00:00	6/5/2013	6/6/2013	13-06015	Thorium-234	EPA 901.1 Modified	-8.94E+01	1.81E+02	1.81E+02	3.17E+02	pCi/l
13-06015-02	MBL	BLANK	06/05/13 00:00	6/5/2013	6/6/2013	13-06015	Thallium-208	EPA 901.1 Modified	-4.85E+00	2.27E+01	2.27E+01	4.27E+01	pCi/l
13-06015-03	DUP	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/6/2013	13-06015	Actinium-228	EPA 901.1 Modified	-2.93E+01	3.53E+01	3.53E+01	5.97E+01	pCi/l
13-06015-03	DUP	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/6/2013	13-06015	Bismuth-214	EPA 901.1 Modified	3.99E+01	2.87E+01	2.88E+01	4.60E+01	pCi/l
13-06015-03	DUP	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/6/2013	13-06015	Cobalt-60	EPA 901.1 Modified	-8.80E+00	8.52E+00	8.53E+00	1.30E+01	pCi/l
13-06015-03	DUP	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/6/2013	13-06015	Cesium-137	EPA 901.1 Modified	4.51E+00	6.39E+00	6.40E+00	1.48E+01	pCi/l
13-06015-03	DUP	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/6/2013	13-06015	Potassium-40	EPA 901.1 Modified	2.78E+02	1.88E+02	1.87E+02	2.14E+02	pCi/l
13-06015-03	DUP	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/6/2013	13-06015	Lead-210	EPA 901.1 Modified	3.45E+01	1.97E+02	1.97E+02	3.54E+02	pCi/l
13-06015-03	DUP	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/6/2013	13-06015	Lead-214	EPA 901.1 Modified	-2.57E+00	1.78E+01	1.78E+01	3.31E+01	pCi/l
13-06015-03	DUP	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/6/2013	13-06015	Thorium-234	EPA 901.1 Modified	2.98E+01	1.87E+02	1.87E+02	3.36E+02	pCi/l
13-06015-03	DUP	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/6/2013	13-06015	Thallium-208	EPA 901.1 Modified	2.28E+01	2.51E+01	2.51E+01	5.38E+01	pCi/l
13-06015-04	DO	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/6/2013	13-06015	Actinium-228	EPA 901.1 Modified	5.18E+00	2.53E+01	2.53E+01	5.77E+01	pCi/l
13-06015-04	DO	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/6/2013	13-06015	Bismuth-214	EPA 901.1 Modified	5.78E+00	1.93E+01	1.93E+01	3.92E+01	pCi/l
13-06015-04	DO	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/6/2013	13-06015	Cobalt-60	EPA 901.1 Modified	-5.34E+00	7.14E+00	7.14E+00	1.09E+01	pCi/l
13-06015-04	DO	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/6/2013	13-06015	Cesium-137	EPA 901.1 Modified	6.62E+00	8.35E+00	8.36E+00	1.77E+01	pCi/l
13-06015-04	DO	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/6/2013	13-06015	Potassium-40	EPA 901.1 Modified	2.05E+02	1.46E+02	1.46E+02	1.29E+02	pCi/l
13-06015-04	DO	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/6/2013	13-06015	Lead-210	EPA 901.1 Modified	-1.11E+02	1.90E+02	1.90E+02	3.30E+02	pCi/l
13-06015-04	DO	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/6/2013	13-06015	Lead-214	EPA 901.1 Modified	-5.80E+00	1.65E+01	1.65E+01	3.02E+01	pCi/l
13-06015-04	DO	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/6/2013	13-06015	Thorium-234	EPA 901.1 Modified	-2.03E+02	1.86E+02	1.87E+02	3.13E+02	pCi/l
13-06015-04	DO	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/6/2013	13-06015	Thallium-208	EPA 901.1 Modified	3.09E+01	3.02E+01	3.02E+01	5.15E+01	pCi/l

CU=Counting Uncertainty; CSU=Combined Standard Uncertainty (2-sigma); MDA=Minimal Detected Activity; LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original



EBERLINE ANALYTICAL CORPORATION

601 SCARBORO ROAD OAK RIDGE, TN 37830 865/481-0683 FAX 865/483-4621

Eberline Analytical Final Report of Analysis			Report To:					Work Order Details:					
			Matt Stewart					SDG:	13-06059-Revised				
			Herst & Associates, Inc.					Project:	Bridgeton 2013 Leachate				
			4631 N St Peters Pkwy					Analysis Category:	ENVIRONMENTAL				
			St Charles, MO 63304					Sample Matrix:	WA				
Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
13-06059-01	LCS	KNOWN	06/19/13 00:00	6/19/2013	6/20/2013	13-06059	Gross Alpha	EPA 900.0 Modified	3.11E+02	1.34E+01			pCi/l
13-06059-01	LCS	SPIKE	06/19/13 00:00	6/19/2013	6/20/2013	13-06059	Gross Alpha	EPA 900.0 Modified	2.56E+02	3.82E+00	2.81E+01	3.03E-01	pCi/l
13-06059-02	MBL	BLANK	06/19/13 00:00	6/19/2013	6/20/2013	13-06059	Gross Alpha	EPA 900.0 Modified	3.97E-02	1.01E-01	1.01E-01	2.25E-01	pCi/l
13-06059-03	DUP	OUTFALL 008	06/18/13 12:36	6/19/2013	6/20/2013	13-06059	Gross Alpha	EPA 900.0 Modified	2.78E+01	4.72E+01	4.73E+01	1.00E+02	pCi/l
13-06059-04	DO	OUTFALL 008	06/18/13 12:36	6/19/2013	6/20/2013	13-06059	Gross Alpha	EPA 900.0 Modified	4.66E+01	5.89E+01	5.71E+01	1.13E+02	pCi/l
13-06059-01	LCS	KNOWN	06/19/13 00:00	6/19/2013	6/20/2013	13-06059	Gross Beta	EPA 900.0 Modified	2.19E+02	6.56E+00			pCi/l
13-06059-01	LCS	SPIKE	06/19/13 00:00	6/19/2013	6/20/2013	13-06059	Gross Beta	EPA 900.0 Modified	2.49E+02	2.95E+00	3.46E+01	5.82E-01	pCi/l
13-06059-02	MBL	BLANK	06/19/13 00:00	6/19/2013	6/20/2013	13-06059	Gross Beta	EPA 900.0 Modified	8.42E-02	2.61E-01	2.81E-01	5.50E-01	pCi/l
13-06059-03	DUP	OUTFALL 008	06/18/13 12:36	6/19/2013	6/20/2013	13-06059	Gross Beta	EPA 900.0 Modified	4.52E+02	8.30E+01	1.04E+02	1.30E+02	pCi/l
13-06059-04	DO	OUTFALL 008	06/18/13 12:36	6/19/2013	6/20/2013	13-06059	Gross Beta	EPA 900.0 Modified	4.26E+02	8.32E+01	1.02E+02	1.35E+02	pCi/l
13-06059-01	LCS	KNOWN	06/19/13 00:00	6/19/2013	6/27/2013	13-06059	Radium-226	EPA 903.0 Modified	1.03E+01	4.74E-01			pCi/l
13-06059-01	LCS	SPIKE	06/19/13 00:00	6/19/2013	6/27/2013	13-06059	Radium-226	EPA 903.0 Modified	1.06E+01	1.17E+00	2.53E+00	2.30E-01	pCi/l
13-06059-02	MBL	BLANK	06/19/13 00:00	6/19/2013	6/27/2013	13-06059	Radium-226	EPA 903.0 Modified	3.86E-02	9.64E-02	9.68E-02	2.01E-01	pCi/l
13-06059-03	DUP	OUTFALL 008	06/18/13 12:36	6/19/2013	6/27/2013	13-06059	Radium-226	EPA 903.0 Modified	8.67E-02	1.66E-01	1.66E-01	3.05E-01	pCi/l
13-06059-04	DO	OUTFALL 008	06/18/13 12:36	6/19/2013	6/27/2013	13-06059	Radium-226	EPA 903.0 Modified	7.52E-02	1.82E-01	1.63E-01	3.21E-01	pCi/l
13-06059-01	LCS	KNOWN	06/19/13 00:00	6/19/2013	7/1/2013	13-06059	Radium-228	EPA 904.0 Modified	8.92E+00	4.55E-01			pCi/l
13-06059-01	LCS	SPIKE	06/19/13 00:00	6/19/2013	7/1/2013	13-06059	Radium-228	EPA 904.0 Modified	9.89E+00	9.57E-01	2.44E+00	1.19E+00	pCi/l
13-06059-02	MBL	BLANK	06/19/13 00:00	6/19/2013	7/1/2013	13-06059	Radium-228	EPA 904.0 Modified	2.08E+00	7.46E-01	8.82E-01	1.39E+00	pCi/l
13-06059-03	DUP	OUTFALL 008	06/18/13 12:36	6/19/2013	7/1/2013	13-06059	Radium-228	EPA 904.0 Modified	2.89E-01	5.92E-01	5.96E-01	1.23E+00	pCi/l
13-06059-04	DO	OUTFALL 008	06/18/13 12:36	6/19/2013	7/1/2013	13-06059	Radium-228	EPA 904.0 Modified	2.64E+00	6.78E-01	9.04E-01	1.19E+00	pCi/l
13-06059-01	LCS	KNOWN	06/19/13 00:00	6/19/2013	6/27/2013	13-06059	Uranium-234	EML U-02 Modified	8.14E+00	2.93E-01			pCi/l
13-06059-01	LCS	SPIKE	06/19/13 00:00	6/19/2013	6/27/2013	13-06059	Uranium-234	EML U-02 Modified	6.40E+00	1.15E+00	1.24E+00	1.18E-01	pCi/l
13-06059-02	MBL	BLANK	06/19/13 00:00	6/19/2013	6/27/2013	13-06059	Uranium-234	EML U-02 Modified	1.26E-02	3.71E-02	3.71E-02	8.08E-02	pCi/l
13-06059-03	DUP	OUTFALL 008	06/18/13 12:36	6/19/2013	6/27/2013	13-06059	Uranium-234	EML U-02 Modified	1.09E+00	5.41E-01	5.47E-01	4.03E-01	pCi/l
13-06059-04	DO	OUTFALL 008	06/18/13 12:36	6/19/2013	6/27/2013	13-06059	Uranium-234	EML U-02 Modified	9.55E-01	5.27E-01	5.32E-01	4.04E-01	pCi/l
13-06059-01	LCS	SPIKE	06/19/13 00:00	6/19/2013	6/27/2013	13-06059	Uranium-235	EML U-02 Modified	3.85E-01	2.11E-01	2.13E-01	1.18E-01	pCi/l
13-06059-02	MBL	BLANK	06/19/13 00:00	6/19/2013	6/27/2013	13-06059	Uranium-235	EML U-02 Modified	3.13E-02	5.53E-02	5.54E-02	9.96E-02	pCi/l
13-06059-03	DUP	OUTFALL 008	06/18/13 12:36	6/19/2013	6/27/2013	13-06059	Uranium-235	EML U-02 Modified	1.13E-02	1.58E-01	1.58E-01	4.52E-01	pCi/l
13-06059-04	DO	OUTFALL 008	06/18/13 12:36	6/19/2013	6/27/2013	13-06059	Uranium-235	EML U-02 Modified	5.49E-02	1.68E-01	1.68E-01	3.98E-01	pCi/l

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original



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			4631 N St Peters Pkwy						Analysis Category:	ENVIRONMENTAL			
			St Charles, MO 63304						Sample Matrix:	WA			
Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
13-08059-01	LCS	KNOWN	06/19/13 00:00	6/19/2013	6/27/2013	13-08059	Uranium-238	EML U-02 Modified	7.94E+00	2.88E-01			pCi/l
13-08059-01	LCS	SPIKE	06/19/13 00:00	6/19/2013	6/27/2013	13-08059	Uranium-238	EML U-02 Modified	6.88E+00	1.23E+00	1.33E+00	1.18E-01	pCi/l
13-08059-02	MBL	BLANK	06/19/13 00:00	6/19/2013	6/27/2013	13-08059	Uranium-238	EML U-02 Modified	2.96E-02	4.43E-02	4.43E-02	7.20E-02	pCi/l
13-08059-03	DUP	OUTFALL 008	06/18/13 12:36	6/19/2013	6/27/2013	13-08059	Uranium-238	EML U-02 Modified	9.43E-01	5.08E-01	5.13E-01	4.33E-01	pCi/l
13-08059-04	DO	OUTFALL 008	06/18/13 12:36	6/19/2013	6/27/2013	13-08059	Uranium-238	EML U-02 Modified	3.80E-01	3.27E-01	3.28E-01	3.21E-01	pCi/l
13-08059-01	LCS	KNOWN	06/19/13 00:00	6/19/2013	6/21/2013	13-08059	Cobalt-60	EPA 901.1 Modified	1.94E+05	7.76E+03			pCi/l
13-08059-01	LCS	KNOWN	06/19/13 00:00	6/19/2013	6/21/2013	13-08059	Cesium-137	EPA 901.1 Modified	1.18E+05	4.72E+03			pCi/l
13-08059-01	LCS	SPIKE	06/19/13 00:00	6/19/2013	6/21/2013	13-08059	Cobalt-60	EPA 901.1 Modified	2.07E+05	1.51E+04	1.84E+04	8.73E+02	pCi/l
13-08059-01	LCS	SPIKE	06/19/13 00:00	6/19/2013	6/21/2013	13-08059	Cesium-137	EPA 901.1 Modified	1.28E+05	1.28E+04	1.44E+04	5.90E+02	pCi/l
13-08059-02	MBL	BLANK	06/19/13 00:00	6/19/2013	6/21/2013	13-08059	Actinium-228	EPA 901.1 Modified	-3.54E+00	5.07E+00	5.08E+00	7.93E+00	pCi/l
13-08059-02	MBL	BLANK	06/19/13 00:00	6/19/2013	6/21/2013	13-08059	Bismuth-214	EPA 901.1 Modified	-2.38E+00	2.81E+00	2.81E+00	4.57E+00	pCi/l
13-08059-02	MBL	BLANK	06/19/13 00:00	6/19/2013	6/21/2013	13-08059	Cesium-137	EPA 901.1 Modified	-7.56E-01	1.57E+00	1.57E+00	2.32E+00	pCi/l
13-08059-02	MBL	BLANK	06/19/13 00:00	6/19/2013	6/21/2013	13-08059	Lead-212	EPA 901.1 Modified	-6.41E-01	2.21E+00	2.21E+00	3.31E+00	pCi/l
13-08059-02	MBL	BLANK	06/19/13 00:00	6/19/2013	6/21/2013	13-08059	Lead-214	EPA 901.1 Modified	-1.19E+00	2.55E+00	2.55E+00	4.08E+00	pCi/l
13-08059-02	MBL	BLANK	06/19/13 00:00	6/19/2013	6/21/2013	13-08059	Radium-228	EPA 901.1 Modified	-2.38E+00	2.81E+00	2.81E+00	4.57E+00	pCi/l
13-08059-02	MBL	BLANK	06/19/13 00:00	6/19/2013	6/21/2013	13-08059	Radium-228	EPA 901.1 Modified	-3.54E+00	5.07E+00	5.08E+00	7.93E+00	pCi/l
13-08059-02	MBL	BLANK	06/19/13 00:00	6/19/2013	6/21/2013	13-08059	Thorium-234	EPA 901.1 Modified	-2.23E+01	2.78E+01	2.78E+01	4.68E+01	pCi/l
13-08059-02	MBL	BLANK	06/19/13 00:00	6/19/2013	6/21/2013	13-08059	Thallium-208	EPA 901.1 Modified	-2.78E+00	3.95E+00	3.95E+00	6.28E+00	pCi/l
13-08059-03	DUP	OUTFALL 008	06/18/13 12:36	6/19/2013	6/21/2013	13-08059	Actinium-228	EPA 901.1 Modified	3.18E+00	7.78E+00	7.78E+00	1.37E+01	pCi/l
13-08059-03	DUP	OUTFALL 008	06/18/13 12:36	6/19/2013	6/21/2013	13-08059	Bismuth-214	EPA 901.1 Modified	8.40E-01	4.12E+00	4.12E+00	7.08E+00	pCi/l
13-08059-03	DUP	OUTFALL 008	06/18/13 12:36	6/19/2013	6/21/2013	13-08059	Cesium-137	EPA 901.1 Modified	2.07E-03	1.83E+00	1.83E+00	2.95E+00	pCi/l
13-08059-03	DUP	OUTFALL 008	06/18/13 12:36	6/19/2013	6/21/2013	13-08059	Potassium-40	EPA 901.1 Modified	3.93E+02	6.54E+01	6.84E+01	3.07E+01	pCi/l
13-08059-03	DUP	OUTFALL 008	06/18/13 12:36	6/19/2013	6/21/2013	13-08059	Lead-212	EPA 901.1 Modified	3.80E+00	3.64E+00	3.85E+00	3.50E+00	pCi/l
13-08059-03	DUP	OUTFALL 008	06/18/13 12:36	6/19/2013	6/21/2013	13-08059	Lead-214	EPA 901.1 Modified	1.61E+00	3.58E+00	3.58E+00	6.12E+00	pCi/l
13-08059-03	DUP	OUTFALL 008	06/18/13 12:36	6/19/2013	6/21/2013	13-08059	Radium-228	EPA 901.1 Modified	8.40E-01	4.12E+00	4.12E+00	7.08E+00	pCi/l
13-08059-03	DUP	OUTFALL 008	06/18/13 12:36	6/19/2013	6/21/2013	13-08059	Radium-228	EPA 901.1 Modified	3.18E+00	7.78E+00	7.78E+00	1.37E+01	pCi/l
13-08059-03	DUP	OUTFALL 008	06/18/13 12:36	6/19/2013	6/21/2013	13-08059	Thorium-234	EPA 901.1 Modified	-3.31E+01	3.30E+01	3.31E+01	4.76E+01	pCi/l
13-08059-03	DUP	OUTFALL 008	06/18/13 12:36	6/19/2013	6/21/2013	13-08059	Thallium-208	EPA 901.1 Modified	2.05E-01	5.57E+00	5.57E+00	9.32E+00	pCi/l

CU=Counting Uncertainty; CSU=Combined Standard Uncertainty (2-sigma); MDA=Minimal Detected Activity; LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original



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Eberline Analytical Final Report of Analysis			Report To:					Work Order Details:					
			Matt Stewart					SDG:	13-06059-Revised				
			Herst & Associates, Inc.					Project:	Bridgeton 2013 Leachate				
			4631 N St Peters Pkwy					Analysis Category:	ENVIRONMENTAL				
			St Charles, MO 63304					Sample Matrix:	WA				
Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
13-08059-04	DO	OUTFALL 008	08/18/13 12:36	8/19/2013	8/21/2013	13-08059	Actinium-228	EPA 901.1 Modified	2.99E+00	7.92E+00	7.92E+00	1.42E+01	pCi/l
13-08059-04	DO	OUTFALL 008	08/18/13 12:36	8/19/2013	8/21/2013	13-06059	Bismuth-214	EPA 901.1 Modified	-4.18E+00	3.90E+00	3.91E+00	6.08E+00	pCi/l
13-08059-04	DO	OUTFALL 008	08/18/13 12:36	8/19/2013	8/21/2013	13-08059	Cesium-137	EPA 901.1 Modified	1.54E+00	1.67E+00	1.67E+00	3.21E+00	pCi/l
13-06059-04	DO	OUTFALL 008	08/18/13 12:36	8/19/2013	8/21/2013	13-06059	Potassium-40	EPA 901.1 Modified	3.76E+02	6.73E+01	7.00E+01	2.92E+01	pCi/l
13-06059-04	DO	OUTFALL 008	08/18/13 12:36	8/19/2013	8/21/2013	13-08059	Lead-212	EPA 901.1 Modified	1.81E+00	2.72E+00	2.72E+00	4.72E+00	pCi/l
13-06059-04	DO	OUTFALL 008	08/18/13 12:36	8/19/2013	8/21/2013	13-06059	Lead-214	EPA 901.1 Modified	-1.24E+00	3.58E+00	3.58E+00	5.93E+00	pCi/l
13-08059-04	DO	OUTFALL 008	08/18/13 12:36	8/19/2013	8/21/2013	13-06059	Radium-226	EPA 901.1 Modified	-4.18E+00	3.90E+00	3.91E+00	6.08E+00	pCi/l
13-08059-04	DO	OUTFALL 008	08/18/13 12:36	8/19/2013	8/21/2013	13-06059	Radium-228	EPA 901.1 Modified	2.99E+00	7.92E+00	7.92E+00	1.42E+01	pCi/l
13-08059-04	DO	OUTFALL 008	08/18/13 12:36	8/19/2013	8/21/2013	13-06059	Thorium-234	EPA 901.1 Modified	-9.61E+00	3.37E+01	3.37E+01	5.02E+01	pCi/l
13-08059-04	DO	OUTFALL 008	08/18/13 12:36	8/19/2013	8/21/2013	13-08059	Thallium-208	EPA 901.1 Modified	4.31E+00	5.57E+00	5.57E+00	8.74E+00	pCi/l

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

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EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD
OAK RIDGE, TENNESSEE 37830
PHONE (865) 481-0683
FAX (865) 483-4621

EBS-OR-36238

October 16, 2013

Matt Stewart
Herst & Associates, Inc.
4631 N St. Peters Parkway
St. Charles, MO 63304

CASE NARRATIVE
Work Order # 13-09091-OR

SAMPLE RECEIPT

This work order contains one water sample received 09/17/2013. This sample was analyzed for Isotopic Uranium, Radium-226/228, Gross Alpha/Beta and by Gamma Spectroscopy.

<u>CLIENT ID</u>	<u>LAB ID</u>
OUTFALL 008	13-09091-04

ANALYTICAL METHODS

Isotopic Uranium was analyzed using Method EML U-02 Modified. Radium-226 was analyzed using EPA Method 903.0 Modified. Radium-228 was analyzed using EPA Method 904.0 Modified. Gross Alpha/Beta was performed using EPA Method 900.0 Modified. Gamma Spectroscopy was performed using EPA Method 901.1 Modified.

ANALYTICAL RESULTS

Combined Standard Uncertainty is reported at 2-sigma value.

ISOTOPIC URANIUM

Sample was prepared by removing a representative aliquot followed by mixed acid digestions as appropriate. Uranium was selectively extracted by ion exchange. Uranium was eluted, micro-precipitated and mounted on micro-porous filter media. Sample activities were then determined by alpha spectroscopy using energy specific regions of interest for Uranium-234, Uranium-235 and Uranium-238. Chemical recovery was determined by the use of a Uranium-232 tracer. Activity of the Uranium-232 tracer was determined by alpha spectroscopy using an energy specific region of interest.

2nd Analytical Attempt

Due to low chemical recoveries, sample was reanalyzed. Sample demonstrated acceptable results for all Uranium analyses. Chemical recovery was acceptable for all samples. The Uranium-234, Uranium-235 and Uranium-238 method blank demonstrated acceptable results. Results for the Uranium-234 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable

ANALYTICAL RESULTS CONTINUED

ISOTOPIC URANIUM CONTINUED

limits for the analytical technique. Results for the Uranium-235 and Uranium-238 duplicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Uranium-234 and Uranium-238 laboratory control sample demonstrated an acceptable percent recovery.

RADIUM-226

Sample was prepared by removing a representative aliquot followed by mixed acid digestions as appropriate. This was followed by precipitations of Radium/Barium Sulfate. Precipitates were dissolved in alkaline EDTA. Radium was selectively precipitated and then mounted on micro-porous filter media. Sample was counted by alpha spectroscopy using an energy specific region of interest for Radium-226. Inherent self-absorption from elemental Barium was corrected for in the final result. Chemical recovery was calculated by the use of a Barium-133 tracer, which was determined by HPGe gamma spectroscopy.

Sample demonstrated acceptable results for all Radium-226 analyses. Chemical recovery was acceptable for all samples. The Radium-226 method blank demonstrated acceptable results. Results for the Radium-226 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Radium-226 laboratory control sample demonstrated an acceptable percent recovery.

RADIUM-228

Following alpha spectroscopy analysis of Radium-226, Barium/Radium Sulfate precipitates were redissolved and allowed for sufficient ingrowth of the Actinium-228 daughter. After ingrowth, Actinium-228 was selectively precipitated. Precipitates were filtered and beta emissions for Actinium-228 were then counted on a gas proportional counter. Chemical recovery was determined by the use of a Barium-133 tracer, the activity of which was determined by HPGe gamma spectroscopy and an elemental Yttrium carrier by gravimetric measurements. The product of these two recoveries was used to calculate chemical yield.

Sample demonstrated acceptable results for all Radium-228 analyses. Sample results demonstrated slightly high detection limits. Chemical recovery was acceptable for all samples. The Radium-228 method blank demonstrated acceptable results. Results for the Radium-228 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Radium-228 laboratory control sample demonstrated an acceptable percent recovery.

GROSS ALPHA & BETA

Sample was prepared by evaporation of a representative volumetric aliquot acidified with HNO_3 . Reduced sample was then transferred to a steel planchet for final evaporation to dryness and flaming. Sample was then counted on a gas proportional counter. Results were corrected as required for inherent self-absorption based on residual mass present.

Sample demonstrated acceptable results for all Gross Alpha and Beta analyses. Due to high total solids, sample results demonstrated slightly high detection limits. The Gross Alpha and Beta method blank demonstrated acceptable results. Results for the Gross Alpha duplicate demonstrated a high relative

ANALYTICAL RESULTS CONTINUED

GROSS ALPHA & BETA CONTINUED

percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Gross Beta duplicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Gross Alpha and Beta laboratory control sample demonstrated an acceptable percent recovery.

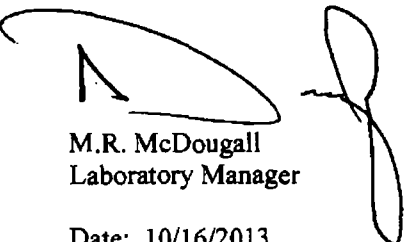
GAMMA SPECTROSCOPY

Sample for Gamma Spectroscopy analysis was prepared by transferring a known aliquot of sample to a standard geometry container. Sample was counted on a High Purity Germanium (HPGe) gamma ray detector.

Sample demonstrated acceptable results for all gamma-emitting radionuclides as reported. Gross Gamma results were calculated based on Potassium-40 which was the only positive gamma emitting radionuclide in this sample. The method blank demonstrated acceptable results for all radionuclides as reported. Results for the Actinium-228 and Bismuth-214 replicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Potassium-40 replicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Cobalt-60 and Cesium-137 laboratory control sample demonstrated an acceptable percent recovery.

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.



M.R. McDougall
Laboratory Manager

Date: 10/16/2013

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SECTION IV
ANALYTICAL RESULTS SUMMARY

Eberline Analytical Final Report of Analysis			Report To:					Work Order Details:						
			Matt Stewart					SDG:	13-09091					
			Herst & Associates, Inc.					Project:	Bridgeton 3Q13 Leachate					
			4631 N St Peters Pkwy					Analysis Category:	ENVIRONMENTAL					
			St Charles, MO 63304					Sample Matrix:	WA					
Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units	
13-09091-01	LCS	KNOWN	09/17/13 00:00	9/17/2013	10/7/2013	13-09091	Cobalt-60	EPA 901.1 Modified	1.95E+05	7.82E+03			pCi/l	
13-09091-01	LCS	KNOWN	09/17/13 00:00	9/17/2013	10/7/2013	13-09091	Cesium-137	EPA 901.1 Modified	1.24E+05	4.97E+03			pCi/l	
13-09091-01	LCS	SPIKE	09/17/13 00:00	9/17/2013	10/7/2013	13-09091	Cobalt-60	EPA 901.1 Modified	2.05E+05	1.34E+04	1.70E+04	6.44E+02	pCi/l	
13-09091-01	LCS	SPIKE	09/17/13 00:00	9/17/2013	10/7/2013	13-09091	Cesium-137	EPA 901.1 Modified	1.30E+05	1.34E+04	1.50E+04	4.77E+02	pCi/l	
13-09091-02	MBL	BLANK	09/17/13 00:00	9/17/2013	10/7/2013	13-09091	Actinium-228	EPA 901.1 Modified	7.28E+00	8.40E+00	8.41E+00	1.15E+01	pCi/l	
13-09091-02	MBL	BLANK	09/17/13 00:00	9/17/2013	10/7/2013	13-09091	Bismuth-214	EPA 901.1 Modified	-3.89E+00	3.59E+00	3.59E+00	5.55E+00	pCi/l	
13-09091-02	MBL	BLANK	09/17/13 00:00	9/17/2013	10/7/2013	13-09091	Gross Gamma	EPA 901.1 Modified	-8.70E+00	1.93E+01	1.93E+01	3.41E+01	pCi/l	
13-09091-02	MBL	BLANK	09/17/13 00:00	9/17/2013	10/7/2013	13-09091	Lead-212	EPA 901.1 Modified	-3.20E+00	2.38E+00	2.38E+00	3.87E+00	pCi/l	
13-09091-02	MBL	BLANK	09/17/13 00:00	9/17/2013	10/7/2013	13-09091	Lead-214	EPA 901.1 Modified	-4.55E+00	3.38E+00	3.38E+00	5.00E+00	pCi/l	
13-09091-02	MBL	BLANK	09/17/13 00:00	9/17/2013	10/7/2013	13-09091	Radium-226	EPA 901.1 Modified	-3.89E+00	3.59E+00	3.59E+00	5.55E+00	pCi/l	
13-09091-02	MBL	BLANK	09/17/13 00:00	9/17/2013	10/7/2013	13-09091	Radium-228	EPA 901.1 Modified	7.28E+00	8.40E+00	8.41E+00	1.15E+01	pCi/l	
13-09091-02	MBL	BLANK	09/17/13 00:00	9/17/2013	10/7/2013	13-09091	Thorium-234	EPA 901.1 Modified	9.27E+00	2.55E+01	2.55E+01	4.48E+01	pCi/l	
13-09091-02	MBL	BLANK	09/17/13 00:00	9/17/2013	10/7/2013	13-09091	Thallium-208	EPA 901.1 Modified	-2.25E-01	4.78E+00	4.78E+00	8.73E+00	pCi/l	
13-09091-03	DUP	OUTFALL 008	09/13/13 12:57	9/17/2013	10/7/2013	13-09091	Actinium-228	EPA 901.1 Modified	9.44E+00	9.15E+00	9.16E+00	1.31E+01	pCi/l	
13-09091-03	DUP	OUTFALL 008	09/13/13 12:57	9/17/2013	10/7/2013	13-09091	Bismuth-214	EPA 901.1 Modified	7.10E+00	6.28E+00	6.29E+00	6.92E+00	pCi/l	
13-09091-03	DUP	OUTFALL 008	09/13/13 12:57	9/17/2013	10/7/2013	13-09091	Gross Gamma	EPA 901.1 Modified	6.34E+02	8.48E+01	9.08E+01	2.54E+01	pCi/l	
13-09091-03	DUP	OUTFALL 008	09/13/13 12:57	9/17/2013	10/7/2013	13-09091	Potassium-40	EPA 901.1 Modified	6.34E+02	8.48E+01	9.08E+01	2.54E+01	pCi/l	
13-09091-03	DUP	OUTFALL 008	09/13/13 12:57	9/17/2013	10/7/2013	13-09091	Lead-212	EPA 901.1 Modified	1.57E+00	2.82E+00	2.82E+00	4.80E+00	pCi/l	
13-09091-03	DUP	OUTFALL 008	09/13/13 12:57	9/17/2013	10/7/2013	13-09091	Lead-214	EPA 901.1 Modified	2.41E+00	3.65E+00	3.65E+00	6.04E+00	pCi/l	
13-09091-03	DUP	OUTFALL 008	09/13/13 12:57	9/17/2013	10/7/2013	13-09091	Radium-226	EPA 901.1 Modified	7.10E+00	6.28E+00	6.29E+00	6.92E+00	pCi/l	
13-09091-03	DUP	OUTFALL 008	09/13/13 12:57	9/17/2013	10/7/2013	13-09091	Radium-228	EPA 901.1 Modified	9.44E+00	9.15E+00	9.16E+00	1.31E+01	pCi/l	
13-09091-03	DUP	OUTFALL 008	09/13/13 12:57	9/17/2013	10/7/2013	13-09091	Thorium-234	EPA 901.1 Modified	4.82E+01	4.88E+01	4.88E+01	3.48E+01	pCi/l	
13-09091-03	DUP	OUTFALL 008	09/13/13 12:57	9/17/2013	10/7/2013	13-09091	Thallium-208	EPA 901.1 Modified	9.02E+00	5.68E+00	5.68E+00	6.26E+00	pCi/l	

CU=Counting Uncertainty; CSU=Combined Standard Uncertainty (2-sigma); MDA=Minimal Detected Activity; LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original



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Eberline Analytical Final Report of Analysis			Report To:					Work Order Details:					
			Matt Stewart					SDG:	13-09091				
			Herst & Associates, Inc.					Project:	Bridgeton 3Q13 Leachate				
			4631 N St Peters Pkwy					Analysis Category:	ENVIRONMENTAL				
			St Charles, MO 63304					Sample Matrix:	WA				
Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
13-09091-01	LCS	KNOWN	09/17/13 00:00	9/17/2013	10/8/2013	13-09091	Radium-228	EPA 904.0 Modified	8.54E+00	4.36E-01			pCi/l
13-09091-01	LCS	SPIKE	09/17/13 00:00	9/17/2013	10/8/2013	13-09091	Radium-228	EPA 904.0 Modified	7.23E+00	8.46E-01	1.84E+00	1.13E+00	pCi/l
13-09091-02	MBL	BLANK	09/17/13 00:00	9/17/2013	10/8/2013	13-09091	Radium-228	EPA 904.0 Modified	6.79E-01	5.29E-01	5.50E-01	1.05E+00	pCi/l
13-09091-03	DUP	OUTFALL 008	09/13/13 12:57	9/17/2013	10/8/2013	13-09091	Radium-228	EPA 904.0 Modified	9.87E-01	1.25E+00	1.27E+00	2.57E+00	pCi/l
13-09091-04	DO	OUTFALL 008	09/13/13 12:57	9/17/2013	10/8/2013	13-09091	Radium-228	EPA 904.0 Modified	2.09E+00	1.33E+00	1.41E+00	2.59E+00	pCi/l
13-09091-01	LCS	KNOWN	09/17/13 00:00	9/17/2013	10/8/2013	13-09091	Uranium-234	EML U-02 Modified	8.18E+00	2.95E-01			pCi/l
13-09091-01	LCS	SPIKE	09/17/13 00:00	9/17/2013	10/8/2013	13-09091	Uranium-234	EML U-02 Modified	7.26E+00	9.11E-01	1.05E+00	5.68E-02	pCi/l
13-09091-02	MBL	BLANK	09/17/13 00:00	9/17/2013	10/8/2013	13-09091	Uranium-234	EML U-02 Modified	7.87E-02	6.19E-02	6.21E-02	7.07E-02	pCi/l
13-09091-03	DUP	OUTFALL 008	09/13/13 12:57	9/17/2013	10/8/2013	13-09091	Uranium-234	EML U-02 Modified	3.10E+00	1.38E+00	1.40E+00	8.21E-01	pCi/l
13-09091-04	DO	OUTFALL 008	09/13/13 12:57	9/17/2013	10/8/2013	13-09091	Uranium-234	EML U-02 Modified	1.82E+00	9.90E-01	9.99E-01	7.19E-01	pCi/l
13-09091-01	LCS	SPIKE	09/17/13 00:00	9/17/2013	10/8/2013	13-09091	Uranium-235	EML U-02 Modified	4.63E-01	1.82E-01	1.65E-01	6.39E-02	pCi/l
13-09091-02	MBL	BLANK	09/17/13 00:00	9/17/2013	10/8/2013	13-09091	Uranium-235	EML U-02 Modified	1.89E-02	3.60E-02	3.61E-02	6.67E-02	pCi/l
13-09091-03	DUP	OUTFALL 008	09/13/13 12:57	9/17/2013	10/8/2013	13-09091	Uranium-235	EML U-02 Modified	7.35E-01	8.09E-01	8.11E-01	1.10E+00	pCi/l
13-09091-04	DO	OUTFALL 008	09/13/13 12:57	9/17/2013	10/8/2013	13-09091	Uranium-235	EML U-02 Modified	9.43E-01	8.21E-01	8.24E-01	9.43E-01	pCi/l
13-09091-01	LCS	KNOWN	09/17/13 00:00	9/17/2013	10/8/2013	13-09091	Uranium-238	EML U-02 Modified	7.98E+00	2.87E-01			pCi/l
13-09091-01	LCS	SPIKE	09/17/13 00:00	9/17/2013	10/8/2013	13-09091	Uranium-238	EML U-02 Modified	7.34E+00	9.18E-01	1.08E+00	5.66E-02	pCi/l
13-09091-02	MBL	BLANK	09/17/13 00:00	9/17/2013	10/8/2013	13-09091	Uranium-238	EML U-02 Modified	1.53E-02	2.91E-02	2.91E-02	5.38E-02	pCi/l
13-09091-03	DUP	OUTFALL 008	09/13/13 12:57	9/17/2013	10/8/2013	13-09091	Uranium-238	EML U-02 Modified	2.20E+00	1.15E+00	1.16E+00	6.19E-01	pCi/l
13-09091-04	DO	OUTFALL 008	09/13/13 12:57	9/17/2013	10/8/2013	13-09091	Uranium-238	EML U-02 Modified	2.47E+00	1.15E+00	1.16E+00	6.88E-01	pCi/l

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

8022



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Eberline Analytical Final Report of Analysis			Report To:					Work Order Details:						
			Matt Stewart					SDG:	13-09091					
			Herst & Associates, Inc.					Project:	Bridgeton 3Q13 Leachate					
			4631 N St Peters Pkwy St Charles, MO 63304					Analysis Category:	ENVIRONMENTAL					
								Sample Matrix:	WA					
Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units	
13-09091-04	DO	OUTFALL 008	09/13/13 12:57	9/17/2013	10/8/2013	13-09091	Actinium-228	EPA 901.1 Modified	1.34E+01	8.30E+00	8.33E+00	9.58E+00	pCi/l	
13-09091-04	DO	OUTFALL 008	09/13/13 12:57	9/17/2013	10/8/2013	13-09091	Bismuth-214	EPA 901.1 Modified	1.38E+00	4.04E+00	4.04E+00	8.99E+00	pCi/l	
13-09091-04	DO	OUTFALL 008	09/13/13 12:57	9/17/2013	10/8/2013	13-09091	Gross Gamma	EPA 901.1 Modified	5.89E+02	7.92E+01	8.47E+01	2.54E+01	pCi/l	
13-09091-04	DO	OUTFALL 008	09/13/13 12:57	9/17/2013	10/8/2013	13-09091	Potassium-40	EPA 901.1 Modified	5.89E+02	7.92E+01	8.47E+01	2.54E+01	pCi/l	
13-09091-04	DO	OUTFALL 008	09/13/13 12:57	9/17/2013	10/8/2013	13-09091	Lead-212	EPA 901.1 Modified	4.06E+00	2.78E+00	2.79E+00	3.39E+00	pCi/l	
13-09091-04	DO	OUTFALL 008	09/13/13 12:57	9/17/2013	10/8/2013	13-09091	Lead-214	EPA 901.1 Modified	5.57E+00	3.80E+00	3.81E+00	8.48E+00	pCi/l	
13-09091-04	DO	OUTFALL 008	09/13/13 12:57	9/17/2013	10/8/2013	13-09091	Radium-226	EPA 901.1 Modified	1.38E+00	4.04E+00	4.04E+00	8.99E+00	pCi/l	
13-09091-04	DO	OUTFALL 008	09/13/13 12:57	9/17/2013	10/8/2013	13-09091	Radium-228	EPA 901.1 Modified	1.34E+01	8.30E+00	8.33E+00	9.58E+00	pCi/l	
13-09091-04	DO	OUTFALL 008	09/13/13 12:57	9/17/2013	10/8/2013	13-09091	Thorium-234	EPA 901.1 Modified	8.67E+01	4.89E+01	4.91E+01	3.32E+01	pCi/l	
13-09091-04	DO	OUTFALL 008	09/13/13 12:57	9/17/2013	10/8/2013	13-09091	Thallium-208	EPA 901.1 Modified	3.99E+00	5.27E+00	5.27E+00	9.04E+00	pCi/l	
13-09091-01	LCS	KNOWN	09/17/13 00:00	9/17/2013	10/7/2013	13-09091	Gross Alpha	EPA 900.0 Modified	3.24E+02	1.39E+01			pCi/l	
13-09091-01	LCS	SPIKE	09/17/13 00:00	9/17/2013	10/7/2013	13-09091	Gross Alpha	EPA 900.0 Modified	2.43E+02	6.99E+00	2.74E+01	4.15E-01	pCi/l	
13-09091-02	MBL	BLANK	09/17/13 00:00	9/17/2013	10/7/2013	13-09091	Gross Alpha	EPA 900.0 Modified	-2.66E-02	3.69E-02	3.70E-02	1.47E-01	pCi/l	
13-09091-03	DUP	OUTFALL 008	09/13/13 12:57	9/17/2013	10/7/2013	13-09091	Gross Alpha	EPA 900.0 Modified	8.71E+01	1.21E+02	1.21E+02	2.46E+02	pCi/l	
13-09091-04	DO	OUTFALL 008	09/13/13 12:57	9/17/2013	10/7/2013	13-09091	Gross Alpha	EPA 900.0 Modified	2.16E+02	1.08E+02	1.08E+02	4.05E+01	pCi/l	
13-09091-01	LCS	KNOWN	09/17/13 00:00	9/17/2013	10/7/2013	13-09091	Gross Beta	EPA 900.0 Modified	2.28E+02	6.79E+00			pCi/l	
13-09091-01	LCS	SPIKE	09/17/13 00:00	9/17/2013	10/7/2013	13-09091	Gross Beta	EPA 900.0 Modified	2.43E+02	5.86E+00	3.41E+01	9.17E-01	pCi/l	
13-09091-02	MBL	BLANK	09/17/13 00:00	9/17/2013	10/7/2013	13-09091	Gross Beta	EPA 900.0 Modified	7.68E-02	2.51E-01	2.51E-01	5.30E-01	pCi/l	
13-09091-03	DUP	OUTFALL 008	09/13/13 12:57	9/17/2013	10/7/2013	13-09091	Gross Beta	EPA 900.0 Modified	8.79E+02	1.82E+02	2.19E+02	2.93E+02	pCi/l	
13-09091-04	DO	OUTFALL 008	09/13/13 12:57	9/17/2013	10/7/2013	13-09091	Gross Beta	EPA 900.0 Modified	8.19E+02	1.69E+02	2.04E+02	2.88E+02	pCi/l	
13-09091-01	LCS	KNOWN	09/17/13 00:00	9/17/2013	10/2/2013	13-09091	Radium-226	EPA 903.0 Modified	1.02E+01	4.71E-01			pCi/l	
13-09091-01	LCS	SPIKE	09/17/13 00:00	9/17/2013	10/2/2013	13-09091	Radium-228	EPA 903.0 Modified	1.07E+01	1.22E+00	2.56E+00	1.97E-01	pCi/l	
13-09091-02	MBL	BLANK	09/17/13 00:00	9/17/2013	10/2/2013	13-09091	Radium-226	EPA 903.0 Modified	-5.77E-03	6.75E-02	6.75E-02	1.42E-01	pCi/l	
13-09091-03	DUP	OUTFALL 008	09/13/13 12:57	9/17/2013	10/2/2013	13-09091	Radium-226	EPA 903.0 Modified	6.34E-01	4.96E-01	5.14E-01	4.56E-01	pCi/l	
13-09091-04	DO	OUTFALL 008	09/13/13 12:57	9/17/2013	10/2/2013	13-09091	Radium-228	EPA 903.0 Modified	1.42E-01	2.40E-01	2.42E-01	4.08E-01	pCi/l	

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original



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EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD
OAK RIDGE, TENNESSEE 37830
PHONE (865) 481-0683
FAX (865) 483-4621

EBS-OR-36334

November 5, 2013

Matt Stewart
Herst & Associates, Inc.
4631 N St. Peters Parkway
St. Charles, MO 63304

CASE NARRATIVE
Work Order # 13-10138-OR

SAMPLE RECEIPT

This work order contains one water sample re-logged on 10/28/2013 at the client's request. This sample was analyzed for Isotopic Thorium and Polonium-210.

CLIENT ID

LAB ID

OUTFALL 008

13-10138-04

ANALYTICAL METHODS

Isotopic Thorium was analyzed using Method EML Th-01 Modified. Polonium-210 was analyzed using Method EML Po-2 Modified.

ANALYTICAL RESULTS

Combined Standard Uncertainty is reported at 2-sigma value.

SPECIAL CIRCUMSTANCES

Due to the very high total solids content within this sample, additional analyses were conducted to determine if any possible alpha emitting radionuclides were present from the Uranium and Thorium series. Isotopic Uranium, Radium-226, Radium-228 and gamma spectroscopy were analyzed from the first series of analyses (Eberline work order 13-09091). In order to complete the review of potential radionuclides present within the Uranium and Thorium series, Isotopic Thorium and Polonium-210 were analyzed. Isotopic Thorium was analyzed to evaluate Thorium-232 (the parent radionuclide within the Thorium series) and Polonium-210 was analyzed as one of the last radionuclides present within the Uranium series. Along with data from the previous work order, 13-09091, it is ascertained that this sample does not contain any positive alpha emitting radionuclides.

ISOTOPIC THORIUM

Sample was prepared by removing a representative aliquot followed by mixed acid digestions as appropriate. Thorium was selectively extracted by ion exchange. Thorium was eluted, micro-precipitated and mounted on micro-porous filter media. Sample activities were then determined by alpha spectroscopy using energy specific regions of interest for Thorium-228, Thorium-230 and Thorium-232. Chemical recovery was determined by the use of a Thorium-229 tracer. Activity of the Thorium-229 tracer was determined by alpha spectroscopy using an energy specific region of interest.

ANALYTICAL RESULTS CONTINUED

ISOTOPIC THORIUM CONTINUED

Sample demonstrated significant interference issues during the analysis process. Therefore, results for Thorium-230 were very problematic as a result of spectral trailing of the Thorium-229 into the Thorium-230 region of interest. In the case of the duplicate analysis, this problem was so severe that this result was rejected as not acceptable and therefore is not reported. Thorium-230 results for the duplicate original also demonstrated this problem; however, this result has been reported in an attempt to provide a value for Thorium-230. However, this result is biased positive and should not be considered as a true positive. Results for the Thorium-230 duplicate original should be qualified as "ESTIMATED HIGH". Due to the fact that Thorium-228 and Thorium-232 emissions are far enough from the Thorium-229 tracer, this data was not affected by the spectral trailing issue; however, due to low chemical recoveries, results for Thorium-228 and Thorium-232 have high method detection limits. All Thorium results should be qualified as estimated due to low chemical recoveries. Due to the high total solids content, this sample is not very amenable to this procedure. A reanalysis was not conducted because this would result in the same condition as this analytical attempt. The Thorium-228, Thorium-230 and Thorium-232 method blank demonstrated acceptable results. Results for the Thorium-228, Thorium-230 and Thorium-232 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Thorium-228, Thorium-230 and Thorium-232 laboratory control sample demonstrated an acceptable percent recovery.

POLONIUM-210

An aliquot of the aqueous sample was dried and digested in aqua regia. Sample was subsequently diluted and then aliquots from the dilutions were taken for Polonium-210 chemistry. Sample was buffered with ascorbic acid. Sample was then spontaneously electroplated onto a nickel disc. Sample was traced with Polonium-208 for chemical recovery qualification. Electroplated sample was then counted by alpha spectroscopy.

Sample demonstrated somewhat problematic results for Polonium-210 activity. Chemical recovery is acceptable for all samples. Sample does not demonstrate any positive Polonium-210 activity. The Polonium-210 method blank demonstrated an acceptable result. Result for the Polonium-210 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Polonium-210 laboratory control sample demonstrated an acceptable percent recovery.

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.



M.R. McDougall
Laboratory Manager

Date: 11/5/2013

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SECTION IV
ANALYTICAL RESULTS SUMMARY

Eberline Analytical Final Report of Analysis			Report To:					Work Order Details:					
			Matt Stewart					SDG:	13-10138				
			Herst & Associates, Inc.					Project:	Bridgeton 3Q13 Leachate				
			4631 N St Peters Pkwy					Analysis Category:	ENVIRONMENTAL				
			St Charles, MO 63304					Sample Matrix:	WA				
Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
13-10138-01	LCS	KNOWN	10/28/13 00:00	10/28/2013	10/31/2013	13-10138	Polonium-210	EML Po-2 Modified	7.96E+00	2.95E-01			pCi/l
13-10138-01	LCS	SPIKE	10/28/13 00:00	10/28/2013	10/31/2013	13-10138	Polonium-210	EML Po-2 Modified	7.22E+00	1.20E+00	1.32E+00	1.30E-01	pCi/l
13-10138-02	MBL	BLANK	10/28/13 00:00	10/28/2013	10/31/2013	13-10138	Polonium-210	EML Po-2 Modified	0.00E+00	5.54E-02	5.54E-02	1.20E-01	pCi/l
13-10138-03	DUP	OUTFALL 008	09/13/13 12:57	10/28/2013	10/31/2013	13-10138	Polonium-210	EML Po-2 Modified	8.54E-02	1.57E-01	1.57E-01	3.28E-01	pCi/l
13-10138-04	DO	OUTFALL 008	09/13/13 12:57	10/28/2013	10/31/2013	13-10138	Polonium-210	EML Po-2 Modified	8.83E-01	4.72E-01	4.75E-01	4.47E-01	pCi/l
13-10138-01	LCS	KNOWN	10/28/13 00:00	10/28/2013	10/31/2013	13-10138	Thorium-228	EML Th-01 Modified	4.85E+00	1.75E-01			pCi/l
13-10138-01	LCS	SPIKE	10/28/13 00:00	10/28/2013	10/31/2013	13-10138	Thorium-228	EML Th-01 Modified	5.31E+00	8.50E-01	9.88E-01	8.11E-02	pCi/l
13-10138-02	MBL	BLANK	10/28/13 00:00	10/28/2013	10/31/2013	13-10138	Thorium-228	EML Th-01 Modified	4.13E-02	5.36E-02	5.37E-02	7.41E-02	pCi/l
13-10138-03	DUP	OUTFALL 008	09/13/13 12:57	10/28/2013	10/31/2013	13-10138	Thorium-228	EML Th-01 Modified	-5.98E-01	1.28E+00	1.28E+00	3.70E+00	pCi/l
13-10138-04	DO	OUTFALL 008	09/13/13 12:57	10/28/2013	10/31/2013	13-10138	Thorium-228	EML Th-01 Modified	6.64E-01	1.11E+00	1.11E+00	1.91E+00	pCi/l
13-10138-01	LCS	KNOWN	10/28/13 00:00	10/28/2013	10/31/2013	13-10138	Thorium-230	EML Th-01 Modified	5.45E+00	1.47E-01			pCi/l
13-10138-01	LCS	SPIKE	10/28/13 00:00	10/28/2013	10/31/2013	13-10138	Thorium-230	EML Th-01 Modified	4.82E+00	7.87E-01	9.87E-01	7.55E-02	pCi/l
13-10138-02	MBL	BLANK	10/28/13 00:00	10/28/2013	10/31/2013	13-10138	Thorium-230	EML Th-01 Modified	8.26E-02	7.65E-02	7.72E-02	8.78E-02	pCi/l
13-10138-04	DO	OUTFALL 008	09/13/13 12:57	10/28/2013	10/31/2013	13-10138	Thorium-230	EML Th-01 Modified	1.75E+00	1.45E+00	1.47E+00	1.07E+00	pCi/l
13-10138-01	LCS	KNOWN	10/28/13 00:00	10/28/2013	10/31/2013	13-10138	Thorium-232	EML Th-01 Modified	4.85E+00	1.75E-01			pCi/l
13-10138-01	LCS	SPIKE	10/28/13 00:00	10/28/2013	10/31/2013	13-10138	Thorium-232	EML Th-01 Modified	5.06E+00	8.18E-01	9.32E-01	8.62E-02	pCi/l
13-10138-02	MBL	BLANK	10/28/13 00:00	10/28/2013	10/31/2013	13-10138	Thorium-232	EML Th-01 Modified	4.65E-02	8.13E-02	6.14E-02	9.28E-02	pCi/l
13-10138-03	DUP	OUTFALL 008	09/13/13 12:57	10/28/2013	10/31/2013	13-10138	Thorium-232	EML Th-01 Modified	4.84E-01	1.13E+00	1.13E+00	2.33E+00	pCi/l
13-10138-04	DO	OUTFALL 008	09/13/13 12:57	10/28/2013	10/31/2013	13-10138	Thorium-232	EML Th-01 Modified	9.38E-01	1.06E+00	1.06E+00	1.23E+00	pCi/l

CU=Counting Uncertainty; CSU=Combined Standard Uncertainty (2-sigma); MDA=Minimal Detected Activity; LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original



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EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD
OAK RIDGE, TENNESSEE 37830
PHONE (865) 481-0683
FAX (865) 483-4621

EBS-OR-36640

January 17, 2014

Matt Stewart
Herst & Associates, Inc.
4631 N St. Peters Parkway
St. Charles, MO 63304

CASE NARRATIVE
Work Order # 14-01006-OR

SAMPLE RECEIPT

This work order contains one water sample received 01/02/2014. This sample was analyzed for Isotopic Uranium, Radium-226/228, Gross Alpha/Beta and by Gamma Spectroscopy.

CLIENT ID

LAB ID

OUTFALL 008

14-01006-04

ANALYTICAL METHODS

Isotopic Uranium was analyzed using Method EML U-02 Modified. Radium-226 was analyzed using EPA Method 903.0 Modified. Radium-228 was analyzed using EPA Method 904.0 Modified. Gross Alpha/Beta was performed using EPA Method 900.0 Modified. Gamma Spectroscopy was performed using EPA Method 901.1 Modified.

ANALYTICAL RESULTS

Combined Standard Uncertainty is reported at 2-sigma value.

ISOTOPIC URANIUM

Sample was prepared by removing a representative aliquot followed by mixed acid digestions as appropriate. Uranium was selectively extracted by ion exchange. Uranium was eluted, micro-precipitated and mounted on micro-porous filter media. Sample activities were then determined by alpha spectroscopy using energy specific regions of interest for Uranium-234, Uranium-235 and Uranium-238. Chemical recovery was determined by the use of a Uranium-232 tracer. Activity of the Uranium-232 tracer was determined by alpha spectroscopy using an energy specific region of interest.

Sample demonstrated acceptable results for all Uranium analyses. Chemical recovery was acceptable for all samples. The Uranium-234, Uranium-235 and Uranium-238 method blank demonstrated acceptable results. Results for the Uranium-234 and Uranium-235 duplicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Uranium-238 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Uranium-234 and Uranium-238 laboratory control sample demonstrated an acceptable percent recovery.

ANALYTICAL RESULTS CONTINUED

RADIUM-226

Sample was prepared by removing a representative aliquot followed by mixed acid digestions as appropriate. This was followed by selective sulfate precipitations of the Radium. Sample was then mounted by semi-micro-precipitations onto micro-porous filters. Sample was counted by alpha spectroscopy using an energy specific region of interest for Radium-226. Chemical recovery was calculated by the use of a Barium-133 tracer, which was determined by HPGe gamma spectroscopy.

Sample demonstrated acceptable results for all Radium-226 analyses. Chemical recovery was acceptable for all samples. The Radium-226 method blank demonstrated acceptable results. Results for the Radium-226 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Radium-226 laboratory control sample demonstrated an acceptable percent recovery.

RADIUM-228

Following alpha spectroscopy analysis of Radium-226, Barium/Radium Sulfate precipitates were redissolved and allowed for sufficient ingrowth of the Actinium-228 daughter. After ingrowth, Actinium-228 was selectively precipitated. Precipitates were filtered and beta emissions for Actinium-228 were then counted on a gas proportional counter. Chemical recovery was determined by the use of a Barium-133 tracer, the activity of which was determined by HPGe gamma spectroscopy and an elemental Yttrium carrier by gravimetric measurements. The product of these two recoveries was used to calculate chemical yield.

Sample demonstrated acceptable results for all Radium-228 analyses. Sample results demonstrated slightly high detection limits. Chemical recovery was acceptable for all samples. The Radium-228 method blank demonstrated acceptable results. Results for the Radium-228 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Radium-228 laboratory control sample demonstrated an acceptable percent recovery.

GROSS ALPHA & BETA

Sample was prepared by evaporation of a representative volumetric aliquot acidified with HNO_3 . Reduced sample was then transferred to a steel planchet for final evaporation to dryness and flaming. Sample was then counted on a gas proportional counter. Results were corrected as required for inherent self-absorption based on residual mass present.

Sample demonstrated acceptable results for all Gross Alpha and Beta analyses. Sample results demonstrated slightly high detection limits. The Gross Alpha and Beta method blank demonstrated acceptable results. Results for the Gross Alpha and Beta duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Gross Alpha and Beta laboratory control sample demonstrated an acceptable percent recovery.

ANALYTICAL RESULTS CONTINUED

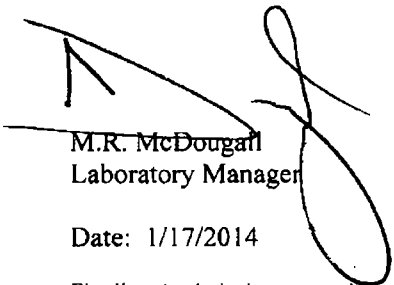
GAMMA SPECTROSCOPY

Sample for Gamma Spectroscopy analysis was prepared by transferring a volumetric aliquot of the sample to a standard geometry container. Sample was counted on a High Purity Germanium (HPGe) gamma ray detector.

Sample demonstrated acceptable results for all gamma-emitting radionuclides as reported. Gross Gamma results were calculated by summation of positive gamma emitting radionuclides. Due to the non-positive nature of the method blank, Gross Gamma results were inferred from Cesium-137 for demonstration of method sensitivity only. The method blank demonstrated acceptable results for all radionuclides as reported. Results for the Actinium-228 replicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Bismuth-214 and Potassium-40 replicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Cobalt-60 and Cesium-137 laboratory control sample demonstrated an acceptable percent recovery.

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.



M.R. McDougall
Laboratory Manager

Date: 1/17/2014

Eberline Analytical wants and encourages your feedback regarding our performance providing radioanalytical services. Please visit <http://www.eberlineservices.com/client.htm> to provide us with feedback on our service.

SECTION IV
ANALYTICAL RESULTS SUMMARY

Eberline Analytical Final Report of Analysis			Report To:						Work Order Details:					
			Matt Stewart						SDG:	14-01006				
			Herst & Associates, Inc.						Project:	Bridgeton 4Q13 Leachate				
			4631 N St Peters Pkwy						Analysis Category:	ENVIRONMENTAL				
			St Charles, MO 63304						Sample Matrix:	WA				
Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units	
14-01006-01	LCS	KNOWN	01/02/14 00:00	1/2/2014	1/3/2014	14-01006	Gross Alpha	EPA 900.0 Modified	3.13E+02	1.35E+01			pCi/l	
14-01006-01	LCS	SPIKE	01/02/14 00:00	1/2/2014	1/3/2014	14-01006	Gross Alpha	EPA 900.0 Modified	2.67E+02	3.71E+00	2.94E+01	2.56E-01	pCi/l	
14-01006-02	MBL	BLANK	01/02/14 00:00	1/2/2014	1/3/2014	14-01006	Gross Alpha	EPA 900.0 Modified	-6.50E-02	9.87E-02	9.90E-02	2.73E-01	pCi/l	
14-01006-03	DUP	OUTFALL 008	12/30/13 10:50	1/2/2014	1/3/2014	14-01006	Gross Alpha	EPA 900.0 Modified	9.11E+00	5.36E+01	5.36E+01	1.31E+02	pCi/l	
14-01006-04	DO	OUTFALL 008	12/30/13 10:50	1/2/2014	1/3/2014	14-01006	Gross Alpha	EPA 900.0 Modified	5.62E+01	6.87E+01	6.90E+01	1.35E+02	pCi/l	
14-01006-01	LCS	KNOWN	01/02/14 00:00	1/2/2014	1/3/2014	14-01006	Gross Beta	EPA 900.0 Modified	2.18E+02	6.53E+00			pCi/l	
14-01006-01	LCS	SPIKE	01/02/14 00:00	1/2/2014	1/3/2014	14-01006	Gross Beta	EPA 900.0 Modified	2.36E+02	2.90E+00	3.27E+01	5.91E-01	pCi/l	
14-01006-02	MBL	BLANK	01/02/14 00:00	1/2/2014	1/3/2014	14-01006	Gross Beta	EPA 900.0 Modified	-1.34E-01	2.99E-01	3.00E-01	8.53E-01	pCi/l	
14-01006-03	DUP	OUTFALL 008	12/30/13 10:50	1/2/2014	1/3/2014	14-01006	Gross Beta	EPA 900.0 Modified	1.80E+02	1.41E+02	1.43E+02	2.81E+02	pCi/l	
14-01006-04	DO	OUTFALL 008	12/30/13 10:50	1/2/2014	1/3/2014	14-01006	Gross Beta	EPA 900.0 Modified	3.49E+02	1.61E+02	1.68E+02	3.07E+02	pCi/l	
14-01008-01	LCS	KNOWN	01/02/14 00:00	1/2/2014	1/10/2014	14-01006	Radium-226	EPA 903.0 Modified	1.01E+01	4.66E-01			pCi/l	
14-01008-01	LCS	SPIKE	01/02/14 00:00	1/2/2014	1/10/2014	14-01006	Radium-226	EPA 903.0 Modified	1.02E+01	1.28E+00	2.51E+00	2.03E-01	pCi/l	
14-01008-02	MBL	BLANK	01/02/14 00:00	1/2/2014	1/10/2014	14-01006	Radium-226	EPA 903.0 Modified	1.69E-01	1.86E-01	1.89E-01	2.54E-01	pCi/l	
14-01008-03	DUP	OUTFALL 008	12/30/13 10:50	1/2/2014	1/10/2014	14-01006	Radium-226	EPA 903.0 Modified	4.84E-01	5.98E-01	6.06E-01	8.35E-01	pCi/l	
14-01008-04	DO	OUTFALL 008	12/30/13 10:50	1/2/2014	1/10/2014	14-01006	Radium-226	EPA 903.0 Modified	3.48E-01	5.29E-01	5.34E-01	7.90E-01	pCi/l	
14-01006-01	LCS	KNOWN	01/02/14 00:00	1/2/2014	1/15/2014	14-01006	Radium-228	EPA 904.0 Modified	8.19E+00	4.18E-01			pCi/l	
14-01006-01	LCS	SPIKE	01/02/14 00:00	1/2/2014	1/15/2014	14-01006	Radium-228	EPA 904.0 Modified	8.70E+00	8.54E-01	2.15E+00	1.01E+00	pCi/l	
14-01008-02	MBL	BLANK	01/02/14 00:00	1/2/2014	1/15/2014	14-01006	Radium-228	EPA 904.0 Modified	7.84E-01	5.57E-01	5.84E-01	1.10E+00	pCi/l	
14-01008-03	DUP	OUTFALL 008	12/30/13 10:50	1/2/2014	1/15/2014	14-01006	Radium-228	EPA 904.0 Modified	1.30E+00	1.04E+00	1.08E+00	2.08E+00	pCi/l	
14-01008-04	DO	OUTFALL 008	12/30/13 10:50	1/2/2014	1/15/2014	14-01006	Radium-228	EPA 904.0 Modified	4.91E-01	1.08E+00	1.09E+00	2.26E+00	pCi/l	
14-01006-01	LCS	KNOWN	01/02/14 00:00	1/2/2014	1/9/2014	14-01006	Uranium-234	EML U-02 Modified	8.03E+00	2.89E-01			pCi/l	
14-01006-01	LCS	SPIKE	01/02/14 00:00	1/2/2014	1/9/2014	14-01006	Uranium-234	EML U-02 Modified	6.68E+00	8.74E-01	9.95E-01	6.45E-02	pCi/l	
14-01006-02	MBL	BLANK	01/02/14 00:00	1/2/2014	1/9/2014	14-01006	Uranium-234	EML U-02 Modified	1.08E-01	9.54E-02	9.57E-02	1.23E-01	pCi/l	
14-01008-03	DUP	OUTFALL 008	12/30/13 10:50	1/2/2014	1/9/2014	14-01006	Uranium-234	EML U-02 Modified	5.50E+00	1.90E+00	1.94E+00	8.91E-01	pCi/l	
14-01008-04	DO	OUTFALL 008	12/30/13 10:50	1/2/2014	1/9/2014	14-01006	Uranium-234	EML U-02 Modified	4.91E+00	1.82E+00	1.85E+00	1.03E+00	pCi/l	

CU=Counting Uncertainty; CSU=Combined Standard Uncertainty (2-sigma); MDA=Minimal Detected Activity; LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original



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601 SCARBORO ROAD OAK RIDGE, TN 37830 865/481-0683 FAX 865/483-4621

Eberline Analytical Final Report of Analysis			Report To:						Work Order Details:				
			Matt Stewart						SDG:	14-01006			
			Herst & Associates, Inc.						Project:	Bridgeton 4Q13 Leachate			
			4631 N St Peters Pkwy St Charles, MO 63304						Analysis Category:	ENVIRONMENTAL			
									Sample Matrix:	WA			
Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
14-01006-01	LCS	SPIKE	01/02/14 00:00	1/2/2014	1/9/2014	14-01006	Uranium-235	EML U-02 Modified	5.05E-01	1.74E-01	1.77E-01	5.88E-02	pCi/l
14-01006-02	MBL	BLANK	01/02/14 00:00	1/2/2014	1/9/2014	14-01006	Uranium-235	EML U-02 Modified	9.28E-02	9.20E-02	9.23E-02	1.08E-01	pCi/l
14-01006-03	DUP	OUTFALL 008	12/30/13 10:50	1/2/2014	1/9/2014	14-01006	Uranium-235	EML U-02 Modified	1.10E+00	9.59E-01	9.62E-01	1.10E+00	pCi/l
14-01006-04	DO	OUTFALL 008	12/30/13 10:50	1/2/2014	1/9/2014	14-01006	Uranium-235	EML U-02 Modified	1.02E+00	9.06E-01	9.09E-01	9.75E-01	pCi/l
14-01006-01	LCS	KNOWN	01/02/14 00:00	1/2/2014	1/9/2014	14-01006	Uranium-238	EML U-02 Modified	7.83E+00	2.82E-01			pCi/l
14-01006-01	LCS	SPIKE	01/02/14 00:00	1/2/2014	1/9/2014	14-01006	Uranium-238	EML U-02 Modified	7.05E+00	9.12E-01	1.04E+00	4.75E-02	pCi/l
14-01006-02	MBL	BLANK	01/02/14 00:00	1/2/2014	1/9/2014	14-01006	Uranium-238	EML U-02 Modified	-1.00E-03	6.13E-02	6.13E-02	1.49E-01	pCi/l
14-01006-03	DUP	OUTFALL 008	12/30/13 10:50	1/2/2014	1/9/2014	14-01006	Uranium-238	EML U-02 Modified	6.51E+00	2.09E+00	2.14E+00	9.32E-01	pCi/l
14-01006-04	DO	OUTFALL 008	12/30/13 10:50	1/2/2014	1/9/2014	14-01006	Uranium-238	EML U-02 Modified	4.12E+00	1.63E+00	1.65E+00	7.87E-01	pCi/l
14-01006-01	LCS	KNOWN	01/02/14 00:00	1/2/2014	1/6/2014	14-01006	Cobalt-60	EPA 901.1 Modified	1.85E+05	7.82E+03			pCi/l
14-01006-01	LCS	KNOWN	01/02/14 00:00	1/2/2014	1/6/2014	14-01006	Cesium-137	EPA 901.1 Modified	1.24E+05	4.97E+03			pCi/l
14-01006-01	LCS	SPIKE	01/02/14 00:00	1/2/2014	1/6/2014	14-01006	Cobalt-60	EPA 901.1 Modified	2.03E+05	1.18E+04	1.57E+04	7.91E+02	pCi/l
14-01006-01	LCS	SPIKE	01/02/14 00:00	1/2/2014	1/6/2014	14-01006	Cesium-137	EPA 901.1 Modified	1.30E+05	1.21E+04	1.38E+04	8.33E+02	pCi/l
14-01006-02	MBL	BLANK	01/02/14 00:00	1/2/2014	1/6/2014	14-01006	Actinium-228	EPA 901.1 Modified	3.08E+00	7.38E+00	7.38E+00	1.45E+01	pCi/l
14-01006-02	MBL	BLANK	01/02/14 00:00	1/2/2014	1/6/2014	14-01006	Bismuth-214	EPA 901.1 Modified	2.67E+00	4.38E+00	4.38E+00	8.34E+00	pCi/l
14-01006-02	MBL	BLANK	01/02/14 00:00	1/2/2014	1/6/2014	14-01006	Cesium-137	EPA 901.1 Modified	4.48E+00	3.28E+00	3.28E+00	5.29E+00	pCi/l
14-01006-02	MBL	BLANK	01/02/14 00:00	1/2/2014	1/6/2014	14-01006	Gross Gamma	EPA 901.1 Modified	4.48E+00	3.28E+00	3.28E+00	5.29E+00	pCi/l
14-01006-02	MBL	BLANK	01/02/14 00:00	1/2/2014	1/6/2014	14-01006	Lead-212	EPA 901.1 Modified	4.62E+00	2.78E+00	2.79E+00	5.68E+00	pCi/l
14-01006-02	MBL	BLANK	01/02/14 00:00	1/2/2014	1/6/2014	14-01006	Lead-214	EPA 901.1 Modified	3.63E+00	3.29E+00	3.30E+00	6.85E+00	pCi/l
14-01006-02	MBL	BLANK	01/02/14 00:00	1/2/2014	1/6/2014	14-01006	Radium-226	EPA 901.1 Modified	2.67E+00	4.38E+00	4.38E+00	8.34E+00	pCi/l
14-01006-02	MBL	BLANK	01/02/14 00:00	1/2/2014	1/6/2014	14-01006	Radium-228	EPA 901.1 Modified	3.08E+00	7.38E+00	7.38E+00	1.45E+01	pCi/l
14-01006-02	MBL	BLANK	01/02/14 00:00	1/2/2014	1/6/2014	14-01006	Thorium-234	EPA 901.1 Modified	5.67E+01	2.85E+01	2.86E+01	5.73E+01	pCi/l
14-01006-02	MBL	BLANK	01/02/14 00:00	1/2/2014	1/6/2014	14-01006	Thallium-208	EPA 901.1 Modified	7.25E+00	6.23E+00	6.24E+00	1.23E+01	pCi/l

CU=Counting Uncertainty; CSU=Combined Standard Uncertainty (2-sigma); MDA=Minimal Detected Activity; LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original



EBERLINE ANALYTICAL CORPORATION

601 SCARBORO ROAD OAK RIDGE, TN 37830 865/481-0683 FAX 865/483-4621

Eberline Analytical Final Report of Analysis			Report To:					Work Order Details:					
			Matt Stewart					SDG:	14-01006				
			Herst & Associates, Inc.					Project:	Bridgeton 4Q13 Leachate				
			4631 N St Peters Pkwy					Analysis Category:	ENVIRONMENTAL				
			St Charles, MO 63304					Sample Matrix:	WA				
Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
14-01006-03	DUP	OUTFALL 008	12/30/13 10:50	1/2/2014	1/6/2014	14-01006	Actinium-228	EPA 901.1 Modified	6.64E+00	8.67E+00	8.67E+00	1.72E+01	pCi/l
14-01006-03	DUP	OUTFALL 008	12/30/13 10:50	1/2/2014	1/6/2014	14-01006	Bismuth-214	EPA 901.1 Modified	2.51E+00	4.61E+00	4.61E+00	8.67E+00	pCi/l
14-01006-03	DUP	OUTFALL 008	12/30/13 10:50	1/2/2014	1/6/2014	14-01006	Cesium-137	EPA 901.1 Modified	-1.09E+00	2.34E+00	2.34E+00	4.10E+00	pCi/l
14-01006-03	DUP	OUTFALL 008	12/30/13 10:50	1/2/2014	1/6/2014	14-01006	Gross Gamma	EPA 901.1 Modified	5.36E+02	9.11E+01	9.52E+01	7.39E+01	pCi/l
14-01006-03	DUP	OUTFALL 008	12/30/13 10:50	1/2/2014	1/6/2014	14-01006	Potassium-40	EPA 901.1 Modified	5.33E+02	8.65E+01	9.07E+01	6.52E+01	pCi/l
14-01006-03	DUP	OUTFALL 008	12/30/13 10:50	1/2/2014	1/6/2014	14-01006	Lead-212	EPA 901.1 Modified	5.33E+00	2.86E+00	2.87E+00	5.88E+00	pCi/l
14-01006-03	DUP	OUTFALL 008	12/30/13 10:50	1/2/2014	1/6/2014	14-01006	Lead-214	EPA 901.1 Modified	3.32E+00	3.48E+00	3.48E+00	7.11E+00	pCi/l
14-01006-03	DUP	OUTFALL 008	12/30/13 10:50	1/2/2014	1/6/2014	14-01006	Radium-226	EPA 901.1 Modified	2.51E+00	4.61E+00	4.61E+00	8.67E+00	pCi/l
14-01006-03	DUP	OUTFALL 008	12/30/13 10:50	1/2/2014	1/6/2014	14-01006	Radium-228	EPA 901.1 Modified	6.64E+00	8.67E+00	8.67E+00	1.72E+01	pCi/l
14-01006-03	DUP	OUTFALL 008	12/30/13 10:50	1/2/2014	1/6/2014	14-01006	Thorium-234	EPA 901.1 Modified	1.49E+02	4.17E+01	4.24E+01	8.30E+01	pCi/l
14-01006-03	DUP	OUTFALL 008	12/30/13 10:50	1/2/2014	1/6/2014	14-01006	Thallium-208	EPA 901.1 Modified	4.45E+00	6.14E+00	6.14E+00	1.19E+01	pCi/l
14-01006-04	DO	OUTFALL 008	12/30/13 10:50	1/2/2014	1/6/2014	14-01006	Actinium-228	EPA 901.1 Modified	9.10E+00	8.59E+00	8.61E+00	1.75E+01	pCi/l
14-01006-04	DO	OUTFALL 008	12/30/13 10:50	1/2/2014	1/6/2014	14-01006	Bismuth-214	EPA 901.1 Modified	3.21E+00	4.21E+00	4.21E+00	8.18E+00	pCi/l
14-01006-04	DO	OUTFALL 008	12/30/13 10:50	1/2/2014	1/6/2014	14-01006	Cesium-137	EPA 901.1 Modified	-1.20E+00	1.93E+00	1.93E+00	3.42E+00	pCi/l
14-01006-04	DO	OUTFALL 008	12/30/13 10:50	1/2/2014	1/6/2014	14-01006	Gross Gamma	EPA 901.1 Modified	5.78E+02	9.13E+01	9.60E+01	6.90E+01	pCi/l
14-01006-04	DO	OUTFALL 008	12/30/13 10:50	1/2/2014	1/6/2014	14-01006	Potassium-40	EPA 901.1 Modified	5.75E+02	8.71E+01	9.19E+01	6.08E+01	pCi/l
14-01006-04	DO	OUTFALL 008	12/30/13 10:50	1/2/2014	1/6/2014	14-01006	Lead-212	EPA 901.1 Modified	4.47E+00	4.81E+00	4.81E+00	8.03E+00	pCi/l
14-01006-04	DO	OUTFALL 008	12/30/13 10:50	1/2/2014	1/6/2014	14-01006	Lead-214	EPA 901.1 Modified	6.56E+00	5.85E+00	5.86E+00	9.87E+00	pCi/l
14-01006-04	DO	OUTFALL 008	12/30/13 10:50	1/2/2014	1/6/2014	14-01006	Radium-226	EPA 901.1 Modified	3.21E+00	4.21E+00	4.21E+00	8.18E+00	pCi/l
14-01006-04	DO	OUTFALL 008	12/30/13 10:50	1/2/2014	1/6/2014	14-01006	Radium-228	EPA 901.1 Modified	9.10E+00	8.59E+00	8.61E+00	1.75E+01	pCi/l
14-01006-04	DO	OUTFALL 008	12/30/13 10:50	1/2/2014	1/6/2014	14-01006	Thorium-234	EPA 901.1 Modified	1.78E+02	4.26E+01	4.36E+01	8.45E+01	pCi/l
14-01006-04	DO	OUTFALL 008	12/30/13 10:50	1/2/2014	1/6/2014	14-01006	Thallium-208	EPA 901.1 Modified	2.84E+00	6.06E+00	6.06E+00	1.16E+01	pCi/l

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601 SCARBORO ROAD OAK RIDGE, TN 37830 865/481-0683 Fax 865/483-4621

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Table 1
Bridgeton Radiological Chemistry

Parameter Total or Dissolved						Solids, total suspended NA	Gross Gamma as Cesium 137 NA	Gross Alpha (radiation) Dissolved	Gross Alpha (radiation) NA	Gross Beta (radiation) Dissolved	Gross Beta (radiation) NA	Gross Gamma NA	Polonium 210 NA	Potassium NA	Potassium 40 NA	Radium 226 NA
Location	Date	lab_name_code	Sample Type	Data Status	lab_sdg											
Outfall008	12/30/2013	Eberline	DO	QC Pending	14-01006	--	-1.20 +/- 1.93 pCi/l	--	56.2 +/- 68.7 pCi/l	--	349 +/- 161 pCi/l	578 +/- 91.3 pCi/l	--	--	575 +/- 87.1 pCi/l	0.346 +/- 0.529 pCi/l
Outfall008	12/30/2013	Eberline	DUP	QC Pending	14-01006	--	-1.09 +/- 2.34 pCi/l	--	9.11 +/- 53.6 pCi/l	--	180 +/- 141 pCi/l	536 +/- 91.1 pCi/l	--	--	533 +/- 86.5 pCi/l	0.464 +/- 0.598 pCi/l
Outfall008	9/13/2013	Eberline	DO	QC Pending	13-09091	--	--	--	216 +/- 106 BQX pCi/l	--	819 +/- 169 pCi/l	589 +/- 79.2 BQX pCi/l	--	--	589 +/- 79.2 pCi/l	0.142 +/- 0.240 pCi/l
Outfall008	9/13/2013	Eberline	DUP	QC Pending	13-09091	--	--	--	87.1 +/- 121 BQX pCi/l	--	879 +/- 182 pCi/l	634 +/- 84.8 BQX pCi/l	--	--	634 +/- 84.8 pCi/l	0.634 +/- 0.496 pCi/l
Outfall008	9/13/2013	Eberline	DO	QC Pending	13-10138	--	--	--	--	--	--	--	0.683 +/- 0.472 pCi/l	--	--	--
Outfall008	9/13/2013	Eberline	DUP	QC Pending	13-10138	--	--	--	--	--	--	--	0.0654 +/- 0.157 pCi/l	--	--	--
Outfall008	9/13/2013	Heritage	DO	QC pending	85228	14000 mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	6/18/2013	Eberline	DO	QC Pending	13-09059	--	1.54 +/- 1.67 pCi/l	--	46.6 +/- 57.1 pCi/l	--	429 +/- 102 pCi/l	--	--	--	376 +/- 70.0 pCi/l	0.0752 +/- 0.163 pCi/l
Outfall008	6/18/2013	Eberline	DUP	QC Pending	13-09059	--	.00207 +/- 1.83 pCi/l	--	27.8 +/- 47.3 pCi/l	--	452 +/- 104 pCi/l	--	--	--	393 +/- 68.4 pCi/l	0.0867 +/- 0.166 pCi/l
Outfall008	6/18/2013	Heritage	DO	QC pending	84835	2800 mg/l	--	--	--	--	--	--	--	--	--	--
Treat Commingled MSD	4/25/2013	PDC	DO	Validated	3043568	1200 mg/l	--	--	--	--	--	--	--	--	--	--
Treat Commingled MSD	4/5/2013	Eberline	DO	Validated	1309015	--	6.62 +/- 8.36 pCi/l	117 +/- 91.3 pCi/l	-28.9 +/- 56.7 pCi/l	464 +/- 141 pCi/l	1860 +/- 290 BQX pCi/l	--	--	557000 ug/l	456 +/- 45.6 pCi/l	--
Treat Commingled MSD	4/5/2013	Eberline	DUP	Validated	1309015	--	4.51 +/- 6.40 pCi/l	--	-14.0 +/- 58.2 pCi/l	--	408 +/- 104 BQX pCi/l	--	--	--	278 +/- 187 pCi/l	--
Treat Commingled MSD	4/5/2013	PDC	DO	Validated	3041134	1500 mg/l	--	--	--	--	--	--	--	--	--	--
Treat Commingled MSD	4/5/2013	TestAmerica	DO	Validated	180-2038-1	--	< 20.0 U pCi/l	--	3.71 +/- 57.3 UG pCi/l	--	--	--	--	--	--	11.4 +/- 2.24 pCi/l
LCH_Outfall008	12/13/2012	TestAmerica	DO	QC Pending	180-1108-1	--	< 20 pCi/l	--	< 3 UG pCi/l	--	379 +/- 80.4 pCi/l	--	--	--	--	14.0 +/- 3.19 pCi/l
Outfall008	12/13/2012	Heritage	DO	QC pending	84037	340 mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	9/18/2012	Heritage	DO	QC pending	53914	1300 mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	9/18/2012	TestAmerica	DO	QC pending	F2190459	--	0.5 +/- 5.6 U pCi/l	--	6 +/- 78 U pCi/l	--	331 +/- 74 pCi/l	--	--	--	--	13.1 +/- 2.7 pCi/l
Outfall008	5/15/2012	Heritage	DO	QC pending	63070	660 mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	5/15/2012	TestAmerica	DO	QC pending	F2E150442	--	-1.4 +/- 6.6 U pCi/l	--	29 +/- 30 U pCi/l	--	160 +/- 33 pCi/l	--	--	--	--	8.6 +/- 2.6 pCi/l
Outfall008	5/15/2012	TestAmerica	DUP	QC pending	F2E150442	--	1.9 +/- 5.3 U pCi/l	--	--	--	--	--	--	--	--	13.4 +/- 3.1 pCi/l
Outfall008	3/6/2012	TestAmerica	DO	QC pending	F2C080411	--	-0.5 +/- 7.3 U pCi/l	--	38 +/- 30 U pCi/l	--	183 +/- 33 pCi/l	--	--	--	--	9.0 +/- 3.8 pCi/l
Outfall008	3/6/2012	TestAmerica	DUP	QC pending	F2C080411	--	0 +/- 4.5 U pCi/l	--	28 +/- 34 U pCi/l	--	170 +/- 32 pCi/l	--	--	--	--	10.8 +/- 3.9 pCi/l
Outfall008	11/29/2011	Heritage	DO	QC pending	62485	61 mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	11/29/2011	TestAmerica	DO	QC pending	F1K290445	--	-1.1 +/- 6.8 U pCi/l	--	21 +/- 15 pCi/l	--	72 +/- 14 pCi/l	--	--	--	--	5.16 +/- 0.77 pCi/l
Outfall008	8/18/2011	Heritage	DO	QC pending	61987	46 mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	8/18/2011	TestAmerica	DO	QC pending	F1H180440	--	-0.3 +/- 6.2 U pCi/l	--	31 +/- 19 pCi/l	--	59 +/- 12 pCi/l	--	--	--	--	3.3 +/- 1.0 pCi/l
Outfall008	5/11/2011	Heritage	DO	QC pending	61541	23 mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	5/11/2011	TestAmerica	DO	QC pending	F1E110517	--	-2.5 +/- 8.4 U pCi/l	--	8 +/- 18 U pCi/l	--	47 +/- 11 pCi/l	--	--	--	--	3.22 +/- 0.38 pCi/l
Outfall008	3/16/2011	Heritage	DO	QC pending	61273	33 mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	3/16/2011	TestAmerica	DO	QC pending	F1C160545	--	0.3 +/- 6.0 U pCi/l	--	3 +/- 13 U pCi/l	--	84 +/- 14 pCi/l	--	--	--	--	4.6 +/- 1.1 pCi/l
Outfall008	11/17/2010	Heritage	DO	QC pending	60800	22 mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	11/17/2010	TestAmerica	DO	Validated	FOK170562	--	2.6 +/- 7.0 U pCi/l	--	15 +/- 10 pCi/l	--	48.2 +/- 9.7 pCi/l	--	--	--	--	4.31 +/- 0.76 pCi/l
Outfall008	9/8/2010	Heritage	DO	QC pending	60486	22 mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	9/8/2010	TestAmerica	DO	Validated	FOI080494	--	0.6 +/- 7.9 U pCi/l	--	9 +/- 13 U pCi/l	--	58 +/- 13 pCi/l	--	--	--	--	2.81 +/- 0.50 pCi/l
Outfall008	5/25/2010	Heritage	DO	QC pending	60022	62 mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	5/25/2010	TestAmerica	DO	Validated	FOE250568	--	3.757 +/- 5.5 U pCi/l	--	5.21 +/- 2.0 U pCi/l	--	114 +/- 9.0 pCi/l	--	--	--	--	3.24 +/- 0.34 pCi/l
Outfall008	5/25/2010	TestAmerica	DUP	Validated	FOE250568	--	6.81 +/- 5.3 U pCi/l	--	1.25 +/- 1.2 U pCi/l	--	109 +/- 8.5 pCi/l	--	--	--	--	3.35 +/- 0.36 pCi/l
Outfall008	2/25/2010	Heritage	DO	QC pending	59950	21 mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	2/25/2010	TestAmerica	DO	Validated	FOB250518	--	3.5 +/- 8.4 U pCi/l	--	10 +/- 10 U pCi/l	--	56.3 +/- 9.4 pCi/l	--	--	--	--	3.60 +/- 0.53 pCi/l
Outfall008	11/4/2009	Heritage	DO	Validated	59175	24 mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	11/4/2009	TestAmerica	DO	Validated	FBK040546	--	-0.06 +/- 5.8 U pCi/l	--	8 +/- 10 U pCi/l	--	73 +/- 13 pCi/l	--	--	--	--	3.71 +/- 0.50 pCi/l
Outfall008	8/8/2009	Heritage	DO	Validated	58742	19 mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	8/8/2009	TestAmerica	DO	Validated	F9H060204	--	-0.7 +/- 9.2 U pCi/l	--	18 +/- 10 pCi/l	--	50.8 +/- 9.7 pCi/l	--	--	--	--	3.51 +/- 0.42 pCi/l
Outfall008	8/8/2009	TestAmerica	DUP	Validated	F9H060204	--	1 +/- 8.6 U pCi/l	--	9 +/- 12 U pCi/l	--	58 +/- 11 U pCi/l	--	--	--	--	--
Outfall008	5/7/2009	Heritage	DO	Validated	58370	25 mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	5/7/2009	TestAmerica	DO	Validated	F9E080107	--	0 +/- 9.4 U pCi/l	--	11.0 +/- 9.9 U pCi/l	--	68 +/- 11 pCi/l	--	--	--	--	4.28 +/- 0.58 pCi/l
Outfall008	2/12/2009	Heritage	DO	Validated	58064	31 mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	2/12/2009	TestAmerica	DO	Validated	F9B120270	--	0.1 +/- 5.9 U pCi/l	--	-4.4 +/- 8.2 U pCi/l	--	73 +/- 13 pCi/l	--	--	--	--	4.24 +/- 0.58 pCi/l
Outfall008	11/4/2008	Heritage	DO	Validated	57674	24 mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	11/4/2008	TestAmerica	DO	Validated	F8K050146	--	0.8 +/- 7.0 U pCi/l	--	20 +/- 12 pCi/l	--	66 +/- 11 pCi/l	--	--	--	--	4.19 +/- 0.54 pCi/l
Outfall008	11/4/2008	TestAmerica	DUP	Validated	F8K050146	--	0.4 +/- 7.5 U pCi/l	--	11 +/- 11 U pCi/l	--	66 +/- 11 pCi/l	--	--	--	--	--
Outfall008	7/18/2008	Heritage	DO	Validated	57153	49 mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	7/18/2008	TestAmerica	DO	Validated	F8G180271	--	-0.07 +/- 7.8 U pCi/l	--	7.3 +/- 7.8 U pCi/l	--	46.4 +/- 8.3 pCi/l	--	--	--	--	3.29 +/- 0.46 pCi/l
Outfall008	7/18/2008	TestAmerica	DUP	Validated	F8G180271	--	-1.1 +/- 8.6 U pCi/l	--	3.2 +/- 7.0 U pCi/l	--	49.0 +/- 8.0 pCi/l	--	--	--	--	--
Outfall008	5/9/2008	Heritage	DO	Validated	56732	15 mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	5/8/2008	TestAmerica	DO	Validated	F8E060240	--	0.5 +/- 6.7 U pCi/l	--	-0.2 +/- 7.7 U pCi/l	--	83 +/- 15 pCi/l	--	--	--	--	4.98 +/- 0.60 pCi/l
Outfall008	5/8/2008	TestAmerica	DUP	Validated	F8E060240	--	-0.7 +/- 8.0 U pCi/l	--	2 +/- 11 U pCi/l	--	88 +/- 16 pCi/l	--	--	--	--	--
Outfall008	3/13/2008	Heritage	DO	Validated	65044	75 mg/l	--	--	--	--	--	--	--	--	--	--

Table 1
Bridgeton Radiological Chemistry

Parameter: Total or Dissolved						Solids, total suspended NA	Gross Gamma as Cesium 137 NA	Gross Alpha (radiation) Dissolved	Gross Alpha (radiation) NA	Gross Beta (radiation) Dissolved	Gross Beta (radiation) NA	Gross Gamma NA	Polonium 210 NA	Potassium NA	Potassium 40 NA	Radium 226 NA
Location	Date	lab_name_code	Sample Type	Data Status	lab_sdg											
Outfall008	3/13/2008	TestAmerica	DO	Validated	F8C130342	--	0.3 +/- 8.4 U pCi/l	--	20 +/- 16 U pCi/l	--	70 +/- 13 pCi/l	--	--	--	--	5.10 +/- 0.81 pCi/l
Outfall008	3/13/2008	TestAmerica	DUP	Validated	F8C130342	--	1.6 +/- 8.2 U pCi/l	--	--	--	--	--	--	--	--	--
Outfall008	11/29/2007	Heritage	DO	Validated	56024	37 mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	11/29/2007	TestAmerica	DO	Validated	F7K290239	--	1 +/- 9.1 U pCi/l	--	11.0 +/- 9.97 U pCi/l	--	71 +/- 16 pCi/l	--	--	--	--	3.94 +/- 0.88 pCi/l
Outfall008	11/29/2007	TestAmerica	DUP	Validated	F7K290239	--	4.1 +/- 6.0 U pCi/l	--	--	--	--	--	--	--	--	--
Outfall008	8/21/2007	Heritage	DO	Validated	55695	11 h mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	8/20/2007	TestAmerica	DO	Validated	F7H220163	--	2.8 +/- 8.9 U pCi/l	--	12 +/- 12 U pCi/l	--	71 +/- 14 pCi/l	--	--	--	--	4.66 +/- 0.80 pCi/l
Outfall008	8/20/2007	TestAmerica	DUP	Validated	F7H220163	--	-1.3 +/- 9.5 U pCi/l	--	--	--	--	--	--	--	--	--
Outfall008	5/22/2007	Heritage	DO	Validated	55411.1	40 mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	5/22/2007	TestAmerica	DO	Validated	F7E220283	--	-2.1 +/- 7.8 U pCi/l	--	24 +/- 13 pCi/l	--	78 +/- 14 pCi/l	--	--	--	--	5.62 +/- 0.81 pCi/l
Outfall008	5/21/2007	TestAmerica	DO	Validated	F7E220283	--	1.9 +/- 7.4 U pCi/l	--	18 +/- 13 U pCi/l	--	68 +/- 13 U pCi/l	--	--	--	--	4.34 +/- 0.64 pCi/l
Outfall008	5/21/2007	TestAmerica	DUP	Validated	F7E220283	--	--	--	11 +/- 12 U pCi/l	--	63 +/- 12 pCi/l	--	--	--	--	--
Outfall008	3/8/2007	Heritage	DO	Validated	5400	25 h mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	3/8/2007	TestAmerica	DO	Validated	F7C980312	--	7.2 +/- 8.0 U pCi/l	--	14 +/- 17 U pCi/l	--	88 +/- 16 pCi/l	--	--	--	--	6.26 +/- 0.88 pCi/l
Outfall008	3/8/2007	TestAmerica	DUP	Validated	F7C980312	--	-9.3 +/- 8.7 U pCi/l	--	--	--	--	--	--	--	--	--
Outfall008	12/21/2006	Heritage	DO	Validated	5182	39 h mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	12/21/2006	TestAmerica	DO	Validated	F6L210233	--	-3 +/- 10 U pCi/l	--	15 +/- 15 U pCi/l	--	81 +/- 17 pCi/l	--	--	--	125 +/- 94 U pCi/l	4.42 +/- 0.72 pCi/l
Outfall008	12/21/2006	TestAmerica	DUP	Validated	F6L210233	--	2.0 +/- 9.0 U pCi/l	--	--	--	--	--	--	--	30 +/- 120 U pCi/l	--
Outfall008	7/29/2006	Heritage	DO	QC pending	4811	22 mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	8/15/2006	Heritage	DO	QC pending	4514	1200 mg/l	--	--	--	--	--	--	--	--	--	--
Outfall008	1/19/2006	Heritage	DO	QC pending	4063	150 mg/l	--	--	--	--	--	--	--	--	--	--

Table 1
Bridgeton Radiological Chemistry

					Parameter	Radium 226	Thorium 228	Thorium 230	Thorium 232	Thorium 234	Uranium	Uranium 234	Uranium 235	Uranium 238
					Total or Dissolved	NA	NA	NA	NA	NA	Total	NA	NA	NA
Location	Date	lab_name_code	Sample Type	Data Status	lab_sdg									
Outfall008	12/30/2013	Eberline	DO	QC Pending	14-01006	0.491 +/- 1.08 pCi/l	--	--	--	176 +/- 42.6 pCi/l	12.73 +/- 4.86 ug/l	4.91 +/- 1.82 pCi/l	1.02 +/- 0.906 pCi/l	4.12 +/- 1.63 pCi/l
Outfall008	12/30/2013	Eberline	DUP	QC Pending	14-01006	1.30 +/- 1.04 pCi/l	--	--	--	149 +/- 41.7 pCi/l	19.86 +/- 6.22 ug/l	5.80 +/- 1.90 pCi/l	1.10 +/- 0.959 pCi/l	6.51 +/- 2.09 pCi/l
Outfall008	9/13/2013	Eberline	DO	QC Pending	13-09091	2.09 +/- 1.33 pCi/l	--	--	--	86.7 +/- 48.9 pCi/l	7.79 +/- 3.43 ug/l	1.82 +/- 0.990 pCi/l	0.943 +/- 0.821 pCi/l	2.47 +/- 1.15 pCi/l
Outfall008	9/13/2013	Eberline	DUP	QC Pending	13-09091	0.987 +/- 1.25 pCi/l	--	--	--	48.2 +/- 48.8 pCi/l	6.88 +/- 3.45 ug/l	3.10 +/- 1.38 pCi/l	0.735 +/- 0.809 pCi/l	2.20 +/- 1.15 pCi/l
Outfall008	9/13/2013	Eberline	DO	QC Pending	13-10138	--	0.664 +/- 1.11 BQX pCi/l	1.75 +/- 1.45 BQX pCi/l	0.938 +/- 1.06 BQX pCi/l	--	--	--	--	--
Outfall008	9/13/2013	Eberline	DUP	QC Pending	13-10138	--	-0.598 +/- 1.28 BQX pCi/l	--	0.464 +/- 1.13 BQX pCi/l	--	--	--	--	--
Outfall008	9/13/2013	Heritage	DO	QC pending	65229	--	--	--	--	--	--	--	--	--
Outfall008	6/18/2013	Eberline	DO	QC Pending	13-06059	2.64 +/- 0.904 pCi/l	--	--	--	-9.61 +/- 33.7 pCi/l	--	0.955 +/- 0.532 pCi/l	0.0549 +/- 0.168 pCi/l	0.380 +/- 0.328 pCi/l
Outfall008	6/18/2013	Eberline	DUP	QC Pending	13-06059	0.289 +/- 0.596 pCi/l	--	--	--	-33.1 +/- 33.1 pCi/l	--	1.09 +/- 0.547 pCi/l	0.0113 +/- 0.158 pCi/l	0.943 +/- 0.513 pCi/l
Outfall008	6/18/2013	Heritage	DO	QC pending	64835	--	--	--	--	--	2.08 ug/l	--	--	--
Treat Commingled MSD	4/25/2013	PDC	DO	Validated	3043568	--	--	--	--	--	--	--	--	--
Treat Commingled MSD	4/5/2013	Eberline	DO	Validated	1306015	11.0 +/- 5.79 pCi/l	--	--	--	-203 +/- 187 pCi/l	--	--	--	--
Treat Commingled MSD	4/5/2013	Eberline	DUP	Validated	1306015	6.99 +/- 6.33 pCi/l	--	--	--	29.8 +/- 187 pCi/l	--	--	--	--
Treat Commingled MSD	4/5/2013	PDC	DO	Validated	3041134	--	--	--	--	--	--	--	--	--
Treat Commingled MSD	4/5/2013	TestAmerica	DO	Validated	160-2039-1	5.36 +/- 3.98 UG pCi/l	--	--	--	--	< 100 ug/l	--	--	--
LCH_Outfall008	12/13/2012	TestAmerica	DO	QC Pending	160-1108-1	9.69 +/- 3.81 pCi/l	--	--	--	--	< 20 ug/l	--	--	--
Outfall008	12/13/2012	Heritage	DO	QC pending	64037	--	--	--	--	--	--	--	--	--
Outfall008	9/19/2012	Heritage	DO	QC pending	63614	--	--	--	--	--	--	--	--	--
Outfall008	9/19/2012	TestAmerica	DO	QC pending	F21190458	7.3 +/- 2.7 pCi/l	--	--	--	--	< 2.0 ug/l	--	--	--
Outfall008	5/15/2012	Heritage	DO	QC pending	63070	--	--	--	--	--	BDL	--	--	--
Outfall008	5/15/2012	TestAmerica	DO	QC pending	F2E150442	3.7 +/- 3.3 U pCi/l	--	--	--	--	--	--	--	--
Outfall008	5/15/2012	TestAmerica	DUP	QC pending	F2E150442	6.2 +/- 2.8 pCi/l	--	--	--	--	--	--	--	--
Outfall008	3/6/2012	TestAmerica	DO	QC pending	F2C080411	7.0 +/- 4.9 U pCi/l	--	--	--	--	< 4.0 ug/l	--	--	--
Outfall008	3/6/2012	TestAmerica	DUP	QC pending	F2C080411	8.9 +/- 5.1 pCi/l	--	--	--	--	--	--	--	--
Outfall008	11/29/2011	Heritage	DO	QC pending	62465	--	--	--	--	--	--	--	--	--
Outfall008	11/29/2011	TestAmerica	DO	QC pending	F1K290445	1.13 +/- 0.51 pCi/l	--	--	--	--	< 5.0 ug/l	--	--	--
Outfall008	8/18/2011	Heritage	DO	QC pending	61987	--	--	--	--	--	--	--	--	--
Outfall008	8/18/2011	TestAmerica	DO	QC pending	F1H180440	2.5 +/- 1.1 pCi/l	--	--	--	--	< 1.0 ug/l	--	--	--
Outfall008	5/11/2011	Heritage	DO	QC pending	61541	--	--	--	--	--	--	--	--	--
Outfall008	5/11/2011	TestAmerica	DO	QC pending	F1E110517	2.04 +/- 0.43 pCi/l	--	--	--	--	< 1.0 ug/l	--	--	--
Outfall008	3/16/2011	Heritage	DO	QC pending	61273	--	--	--	--	--	--	--	--	--
Outfall008	3/16/2011	TestAmerica	DO	QC pending	F1C160545	1.8 +/- 1.4 U pCi/l	--	--	--	--	16.8 +/- 2.3 ug/l	--	--	--
Outfall008	11/17/2010	Heritage	DO	QC pending	60800	--	--	--	--	--	--	--	--	--
Outfall008	11/17/2010	TestAmerica	DO	Validated	F0K170562	1.02 +/- 0.47 pCi/l	--	--	--	--	13.9 +/- 1.9 U ug/l	--	--	--
Outfall008	9/8/2010	Heritage	DO	QC pending	60488	--	--	--	--	--	--	--	--	--
Outfall008	9/8/2010	TestAmerica	DO	Validated	F0J080494	1.46 +/- 0.68 pCi/l	--	--	--	--	16.0 +/- 2.2 ug/l	--	--	--
Outfall008	5/25/2010	Heritage	DO	QC pending	60022	--	--	--	--	--	--	--	--	--
Outfall008	5/25/2010	TestAmerica	DO	Validated	F0E250568	2.18 +/- 0.26 pCi/l	--	--	--	--	0.705 +/- 0.041 ug/l	--	--	--
Outfall008	5/25/2010	TestAmerica	DUP	Validated	F0E250568	2.23 +/- 0.25 pCi/l	--	--	--	--	0.909 +/- 0.051 ug/l	--	--	--
Outfall008	2/25/2010	Heritage	DO	QC pending	59650	--	--	--	--	--	--	--	--	--
Outfall008	2/25/2010	TestAmerica	DO	Validated	F0B250518	1.26 +/- 0.46 pCi/l	--	--	--	--	9.8 +/- 1.3 ug/l	--	--	--
Outfall008	11/4/2009	Heritage	DO	Validated	59175	--	--	--	--	--	--	--	--	--
Outfall008	11/4/2009	TestAmerica	DO	Validated	F9K040546	1.24 +/- 0.53 pCi/l	--	--	--	--	3.03 +/- 0.37 U ug/l	--	--	--
Outfall008	8/6/2009	Heritage	DO	Validated	59742	--	--	--	--	--	--	--	--	--
Outfall008	8/6/2009	TestAmerica	DO	Validated	F9H080204	1.59 +/- 0.37 pCi/l	--	--	--	--	2.57 +/- 0.40 U ug/l	--	--	--
Outfall008	8/6/2009	TestAmerica	DUP	Validated	F9H080204	--	--	--	--	--	--	--	--	--
Outfall008	5/7/2009	Heritage	DO	Validated	59370	--	--	--	--	--	--	--	--	--
Outfall008	5/7/2009	TestAmerica	DO	Validated	F9E080107	1.36 +/- 0.34 pCi/l	--	--	--	--	6.09 +/- 0.83 ug/l	--	--	--
Outfall008	2/12/2009	Heritage	DO	Validated	58064	--	--	--	--	--	--	--	--	--
Outfall008	2/12/2009	TestAmerica	DO	Validated	F9B120270	1.61 +/- 0.43 pCi/l	--	--	--	--	-0.96 +/- 0.19 U ug/l	--	--	--
Outfall008	11/4/2008	Heritage	DO	Validated	57674	--	--	--	--	--	--	--	--	--
Outfall008	11/4/2008	TestAmerica	DO	Validated	F8K050146	1.80 +/- 0.39 pCi/l	--	--	--	--	7.09 +/- 0.88 U ug/l	--	--	--
Outfall008	11/4/2008	TestAmerica	DUP	Validated	F8K050146	--	--	--	--	--	--	--	--	--
Outfall008	7/16/2008	Heritage	DO	Validated	57153	--	--	--	--	--	--	--	--	--
Outfall008	7/16/2008	TestAmerica	DO	Validated	F8G180271	1.44 +/- 0.36 pCi/l	--	--	--	--	--	--	--	--
Outfall008	7/16/2008	TestAmerica	DUP	Validated	F8G180271	--	--	--	--	--	--	--	--	--
Outfall008	5/6/2008	Heritage	DO	Validated	56732	--	--	--	--	--	--	--	--	--
Outfall008	5/6/2008	TestAmerica	DO	Validated	F8E080240	2.01 +/- 0.41 pCi/l	--	--	--	--	0.542 +/- 0.089 U ug/l	--	--	--
Outfall008	5/6/2008	TestAmerica	DUP	Validated	F8E080240	--	--	--	--	--	--	--	--	--
Outfall008	3/13/2008	Heritage	DO	Validated	65044	--	--	--	--	--	--	--	--	--

Table 1
Bridgeton Radiological Chemistry

Parameter Total or Dissolved						Radium 226 NA	Thorium 228 NA	Thorium 230 NA	Thorium 232 NA	Thorium 234 NA	Uranium Total	Uranium 234 NA	Uranium 235 NA	Uranium 238 NA
Location	Date	lab_name_code	Sample Type	Data Status	lab_sdg									
Outfall008	3/13/2008	TestAmerica	DO	Validated	F8C130342	1.66 +/- 0.74 pCi/l	--	--	--	--	0.587 +/- 0.093 U ug/l	--	--	--
Outfall008	3/13/2008	TestAmerica	DUP	Validated	F8C130342	--	--	--	--	--	--	--	--	--
Outfall008	11/29/2007	Heritage	DO	Validated	58024	--	--	--	--	--	--	--	--	--
Outfall008	11/29/2007	TestAmerica	DO	Validated	F7K290239	2.00 +/- 0.58 pCi/l	--	--	--	--	1.07 +/- 0.18 U ug/l	--	--	--
Outfall008	11/29/2007	TestAmerica	DUP	Validated	F7K290239	--	--	--	--	--	--	--	--	--
Outfall008	8/21/2007	Heritage	DO	Validated	55685	--	--	--	--	--	--	--	--	--
Outfall008	8/20/2007	TestAmerica	DO	Validated	F7H220163	1.3 +/- 1.1 U pCi/l	--	--	--	--	-20.0 +/- 2.6 U* ug/l	--	--	--
Outfall008	8/20/2007	TestAmerica	DUP	Validated	F7H220163	--	--	--	--	--	--	--	--	--
Outfall008	5/22/2007	Heritage	DO	Validated	55411.1	--	--	--	--	--	--	--	--	--
Outfall008	5/22/2007	TestAmerica	DO	Validated	F7E220283	1.73 +/- 0.74 pCi/l	--	--	--	--	-0.514 +/- 0.086 U ug/l	--	--	--
Outfall008	5/21/2007	TestAmerica	DO	Validated	F7E220283	1.40 +/- 0.54 pCi/l	--	--	--	--	-0.48 +/- 0.10 U ug/l	--	--	--
Outfall008	5/21/2007	TestAmerica	DUP	Validated	F7E220283	--	--	--	--	--	--	--	--	--
Outfall008	3/8/2007	Heritage	DO	Validated	5400	--	--	--	--	--	--	--	--	--
Outfall008	3/8/2007	TestAmerica	DO	Validated	F7C080312	2.12 +/- 0.59 pCi/l	--	--	--	--	0.424 +/- 0.065 U ug/l	--	--	--
Outfall008	3/8/2007	TestAmerica	DUP	Validated	F7C080312	--	--	--	--	--	--	--	--	--
Outfall008	12/21/2008	Heritage	DO	Validated	5182	--	--	--	--	--	--	--	--	--
Outfall008	12/21/2008	TestAmerica	DO	Validated	F8L210233	3.4 +/- 1.4 pCi/l	--	--	--	--	6.88 +/- 0.86 ug/l	--	--	--
Outfall008	12/21/2008	TestAmerica	DUP	Validated	F8L210233	--	--	--	--	--	--	--	--	--
Outfall008	7/28/2006	Heritage	DO	QC pending	4811	--	--	--	--	--	--	--	--	--
Outfall008	6/15/2006	Heritage	DO	QC pending	4514	--	--	--	--	--	--	--	--	--
Outfall008	1/19/2006	Heritage	DO	QC pending	4063	--	--	--	--	--	--	--	--	--

Data Qualifiers/Footnotes	
Qualifier	Definition
--	Not analyzed/not available.
DO	Duplicate Original.
DUP	Duplicate.
G	The sample MDC is greater than the requested RL.
U	Indicates the analyte was analyzed for but not detected.
BQX	Gross Beta 04/05/2013: Per Eberline Report 13-06015, Potassium 40 results confirm actual activity range for Gross Beta in the range of 407-408 pCi/l.
BQX	Alpha 09/13/2013: Per Eberline Report 13-09091 and 13-10138, further analysis of potential alpha emitters ascertained that the sample does not contain any positive alpha emitting radionuclides.
BQX	Gross Gamma 09/13/2013: Per Eberline Report 13-09091, Gross Gamma results were calculated based on Potassium-40 which was the only positive gamma emitting radionuclide in this sample.
BQX	Thorium 230 09/13/2013: Per Eberline Report 13-10138, Thorium 230 result is biased positive and should not be considered a true positive. Results should be qualified as "Estimated High."
BQX	Thorium 228 and 232 09/13/2013: Per Eberline Report 13-10138, All Thorium results should be qualified as estimated due to low chemical recoveries. Due to the high total solids content, this sample is not very amenable to this procedure.

SECTION IV
ANALYTICAL RESULTS SUMMARY

ANALYTICAL RESULTS CONTINUED

GAMMA SPECTROSCOPY CONTINUED

Sample demonstrated acceptable results for all gamma-emitting radionuclides as reported. The method blank demonstrated acceptable results for all radionuclides as reported. Results for the Actinium-228 and Potassium-40 replicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Bismuth-214 replicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Cobalt-60 and Cesium-137 laboratory control sample demonstrated an acceptable percent recovery.

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.



M.R. McDougall
Laboratory Manager

Date: 7/8/2013

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EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD
OAK RIDGE, TENNESSEE 37830
PHONE (865) 481-0683
FAX (865) 483-4621

EBS-OR-35777

July 8, 2013

Matt Stewart
Herst & Associates, Inc.
4631 N St Peters Pkwy
St Charles, MO 63304

CASE NARRATIVE
Work Order # 13-06059-OR

SAMPLE RECEIPT

This work order contains one water sample received 06/19/2013. This sample was analyzed for Isotopic Uranium, Radium-226/228, Gross Alpha/Beta and by Gamma Spectroscopy.

CLIENT ID

OUTFALL 008

LAB ID

13-06059-04

ANALYTICAL METHODS

Isotopic Uranium was analyzed using Method EML U-02 Modified. Radium-226 was analyzed using EPA Method 903.0 Modified. Radium-228 was analyzed using EPA Method 904.0 Modified. Gross Alpha/Beta was analyzed using EPA Method 900.0 Modified. Gamma Spectroscopy was performed using EPA Method 901.1 Modified.

ANALYTICAL RESULTS

Combined Standard Uncertainty is reported at 2-sigma value.

ISOTOPIC URANIUM

Sample was prepared by removing a representative aliquot followed by mixed acid digestions as appropriate. Uranium was selectively extracted by ion exchange. Uranium was eluted, micro-precipitated and mounted on micro-porous filter media. Sample activities were then determined by alpha spectroscopy using energy specific regions of interest for Uranium-234, Uranium-235 and Uranium-238. Chemical recovery was determined by the use of a Uranium-232 tracer. Activity of the Uranium-232 tracer was determined by alpha spectroscopy using an energy specific region of interest.

2nd Analytical Attempt

Sample was reanalyzed utilizing a smaller aliquot due to no chemical recovery in the initial analysis. Sample demonstrated acceptable results for all Uranium analyses. Chemical recovery was acceptable for all samples. The Uranium-234, Uranium-235 and Uranium-238 method blank demonstrated acceptable results. Results for the Uranium-234 duplicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Uranium-235 and Uranium-238 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Uranium-234 and Uranium-238 laboratory control sample demonstrated an acceptable percent recovery.

ANALYTICAL RESULTS CONTINUED

RADIUM-226

Sample was prepared by removing a representative aliquot followed by mixed acid digestions as appropriate. This was followed by selective sulfate precipitations of the Radium. Sample was then mounted by semi-micro-precipitations onto micro-porous filters. Sample was counted by alpha spectroscopy using an energy specific region of interest for Radium-226. Chemical recovery was calculated by the use of a Barium-133 tracer, which was determined by HPGe gamma spectroscopy.

Sample demonstrated acceptable results for all Radium-226 analyses. Due to high total solids, sample fraction -03 (Client ID: OUTFALL 008 DUP) demonstrated a high self-adsorption-factor (SAF). In this case, the SAF was estimated as 1.0. Chemical recovery was acceptable for all samples. The Radium-226 method blank demonstrated acceptable results. Results for the Radium-226 duplicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Radium-226 laboratory control sample demonstrated an acceptable percent recovery.

RADIUM-228

Following alpha spectroscopy analysis of Radium-226, Barium/Radium Sulfate precipitates were redissolved and time was allowed for sufficient ingrowth of the Actinium-228 daughter. After ingrowth, Actinium-228 was selectively precipitated. Precipitates were filtered and beta emissions for Actinium-228 were then counted on a gas proportional counter. Chemical recovery was determined by the use of a Barium-133 tracer, the activity of which was determined by HPGe gamma spectroscopy and an elemental Yttrium carrier by gravimetric measurements. The product of these two recoveries was used to calculate chemical yield.

Sample demonstrated acceptable results for all Radium-228 analyses. Chemical recovery was acceptable for all samples. The Radium-228 method blank demonstrated acceptable results. Results for the Radium-228 duplicate demonstrated a high relative percent difference and normalized difference. Radium-228 duplicate variations are due to high total solids. Results for the Radium-228 laboratory control sample demonstrated an acceptable percent recovery.

GROSS ALPHA & BETA

Sample was prepared by evaporation of a representative volumetric aliquot acidified with HNO₃. Reduced sample was then transferred to a steel planchet for final evaporation to dryness and flaming. Sample was then counted on a gas proportional counter. Results were corrected as required for inherent self-absorption based on residual mass present.

Sample demonstrated acceptable results for all Gross Alpha and Beta analyses. Due to high total solids, sample results demonstrated slightly high detection limits. The Gross Alpha and Beta method blank demonstrated acceptable results. Results for the Gross Alpha duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Gross Beta duplicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Gross Alpha and Beta laboratory control sample demonstrated an acceptable percent recovery.

GAMMA SPECTROSCOPY

Sample for Gamma Spectroscopy analysis was prepared by transferring a known aliquot of the sample to a standard geometry container. Sample was counted on a High Purity Germanium (HPGe) gamma ray detector.

Eberline Analytical Final Report of Analysis			Report To:					Work Order Details:					
			Ed Galbraith					SDG:	13-06015				
			Barr Engineering					Project:	Bridgeton Landfill				
			1001 Diamond Ridge, Suite 1100					Analysis Category:	ENVIRONMENTAL				
			Jefferson City, MO 65109					Sample Matrix:	WA				
Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
13-06015-01	LCS	KNOWN	06/05/13 00:00	6/5/2013	6/14/2013	13-06015	Radium-228	EPA 904.0 Modified	8.88E+00	4.53E-01			pCi/l
13-06015-01	LCS	SPIKE	06/05/13 00:00	6/5/2013	6/14/2013	13-06015	Radium-228	EPA 904.0 Modified	7.35E+00	9.12E-01	1.90E+00	1.32E+00	pCi/l
13-06015-02	MBL	BLANK	06/05/13 00:00	6/5/2013	6/14/2013	13-06015	Radium-228	EPA 904.0 Modified	1.58E-02	5.43E-01	5.43E-01	1.16E+00	pCi/l
13-06015-03	DUP	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/14/2013	13-06015	Radium-228	EPA 904.0 Modified	6.99E+00	6.13E+00	6.33E+00	1.23E+01	pCi/l
13-06015-04	DO	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/14/2013	13-06015	Radium-228	EPA 904.0 Modified	1.10E+01	5.23E+00	5.79E+00	9.81E+00	pCi/l
13-06015-01	LCS	KNOWN	06/05/13 00:00	6/5/2013	6/7/2013	13-06015	Total Activity	WSRC-RP-89-387 Mod.	1.01E+03	2.22E+01			pCi/l
13-06015-01	LCS	SPIKE	06/05/13 00:00	6/5/2013	6/7/2013	13-06015	Total Activity	WSRC-RP-89-387 Mod.	1.04E+03	5.75E+00	1.47E+02	1.33E+00	pCi/l
13-06015-02	MBL	BLANK	06/05/13 00:00	6/5/2013	6/7/2013	13-06015	Total Activity	WSRC-RP-89-387 Mod.	7.34E+00	9.16E-01	1.38E+00	1.34E+00	pCi/l
13-06015-03	DUP	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/7/2013	13-06015	Total Activity	WSRC-RP-89-387 Mod.	0.00E+00	2.89E+02	2.89E+02	4.93E+02	pCi/l
13-06015-04	DO	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/7/2013	13-06015	Total Activity	WSRC-RP-89-387 Mod.	1.80E+02	2.92E+02	2.93E+02	4.93E+02	pCi/l

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original



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601 SCARBORO ROAD OAK RIDGE, TN 37830 865/481-0683 FAX 865/483-4621

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Eberline Analytical Final Report of Analysis			Report To:					Work Order Details:					
			Ed Galbraith					SDG:	13-06015				
			Barr Engineering					Project:	Bridgeton Landfill				
			1001 Diamond Ridge, Suite 1100					Analysis Category:	ENVIRONMENTAL				
			Jefferson City, MO 65109					Sample Matrix:	WA				
Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
		DERIVED FROM ELEMENTAL POTASSIUM											
13-06015-04	DO	Treated Commingled MSD	04/05/13 13:30			13-06015	Potassium-40	EPA 901.1 Modified	4.56E+02	4.56E+01			pCi/l
13-06015-01	LCS	KNOWN	06/05/13 00:00	6/5/2013	6/7/2013	13-06015	Gross Alpha	EPA 900.0 Modified	3.17E+02	1.36E+01			pCi/l
13-06015-01	LCS	SPIKE	06/05/13 00:00	6/5/2013	6/7/2013	13-06015	Gross Alpha	EPA 900.0 Modified	2.79E+02	3.79E+00	3.07E+01	3.25E-01	pCi/l
13-06015-02	MBL	BLANK	06/05/13 00:00	6/5/2013	6/7/2013	13-06015	Gross Alpha	EPA 900.0 Modified	-6.50E-02	9.87E-02	9.90E-02	2.73E-01	pCi/l
13-06015-03	DUP	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/7/2013	13-06015	Gross Alpha	EPA 900.0 Modified	-1.40E+01	5.81E+01	5.82E+01	1.47E+02	pCi/l
13-06015-04	DO	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/7/2013	13-06015	Gross Alpha	EPA 900.0 Modified	-2.89E+01	5.67E+01	5.67E+01	1.52E+02	pCi/l
13-06015-01	LCS	KNOWN	06/05/13 00:00	6/5/2013	6/14/2013	13-06015	Gross Alpha	EPA 900.0 Modified	3.13E+02	1.35E+01			pCi/l
13-06015-01	LCS	SPIKE	06/05/13 00:00	6/5/2013	6/14/2013	13-06015	Gross Alpha	EPA 900.0 Modified	2.63E+02	5.14E+00	2.91E+01	2.50E-01	pCi/l
13-06015-02	MBL	BLANK	06/05/13 00:00	6/5/2013	6/14/2013	13-06015	Gross Alpha	EPA 900.0 Modified	0.00E+00	1.04E-01	1.04E-01	2.65E-01	pCi/l
13-06015-03	DUP	Treated Commingled MSD-DISS	04/05/13 13:30	6/5/2013	6/14/2013	13-06015	Gross Alpha	EPA 900.0 Modified	2.83E+01	6.79E+01	6.80E+01	1.38E+02	pCi/l
13-06015-05	DO	Treated Commingled MSD-DISS	04/05/13 13:30	6/5/2013	6/14/2013	13-06015	Gross Alpha	EPA 900.0 Modified	1.17E+02	9.04E+01	9.13E+01	1.12E+02	pCi/l
13-06015-06	TRG	Treated Commingled MSD-SUS	04/05/13 13:30	6/5/2013	6/14/2013	13-06015	Gross Alpha	EPA 900.0 Modified	-5.88E+00	4.15E+01	4.15E+01	9.00E+01	pCi/l
13-06015-01	LCS	KNOWN	06/05/13 00:00	6/5/2013	6/7/2013	13-06015	Gross Beta	EPA 900.0 Modified	2.23E+02	6.70E+00			pCi/l
13-06015-01	LCS	SPIKE	06/05/13 00:00	6/5/2013	6/7/2013	13-06015	Gross Beta	EPA 900.0 Modified	2.52E+02	2.98E+00	3.49E+01	6.05E-01	pCi/l
13-06015-02	MBL	BLANK	06/05/13 00:00	6/5/2013	6/7/2013	13-06015	Gross Beta	EPA 900.0 Modified	-2.80E-01	3.23E-01	3.25E-01	7.11E-01	pCi/l
13-06015-03	DUP	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/7/2013	13-06015	Gross Beta	EPA 900.0 Modified	4.08E+02	8.75E+01	1.04E+02	1.47E+02	pCi/l
13-06015-04	DO	Treated Commingled MSD	04/05/13 13:30	6/5/2013	6/7/2013	13-06015	Gross Beta	EPA 900.0 Modified	1.86E+03	1.33E+02	2.90E+02	1.44E+02	pCi/l
13-06015-01	LCS	KNOWN	06/05/13 00:00	6/5/2013	6/14/2013	13-06015	Gross Beta	EPA 900.0 Modified	2.20E+02	6.61E+00			pCi/l
13-06015-01	LCS	SPIKE	06/05/13 00:00	6/5/2013	6/14/2013	13-06015	Gross Beta	EPA 900.0 Modified	2.48E+02	4.20E+00	3.46E+01	7.03E-01	pCi/l
13-06015-02	MBL	BLANK	06/05/13 00:00	6/5/2013	6/14/2013	13-06015	Gross Beta	EPA 900.0 Modified	-3.27E-01	4.06E-01	4.06E-01	7.88E-01	pCi/l
13-06015-03	DUP	Treated Commingled MSD-DISS	04/05/13 13:30	6/5/2013	6/14/2013	13-06015	Gross Beta	EPA 900.0 Modified	6.67E+02	1.30E+02	1.59E+02	1.58E+02	pCi/l
13-06015-05	DO	Treated Commingled MSD-DISS	04/05/13 13:30	6/5/2013	6/14/2013	13-06015	Gross Beta	EPA 900.0 Modified	4.64E+02	1.25E+02	1.41E+02	1.70E+02	pCi/l
13-06015-06	TRG	Treated Commingled MSD-SUS	04/05/13 13:30	6/5/2013	6/14/2013	13-06015	Gross Beta	EPA 900.0 Modified	1.48E+02	7.57E+01	7.83E+01	1.15E+02	pCi/l

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample;MBL=Blank;DUP=Duplicate;TRG=Normal Sample;DO=Duplicate Original



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